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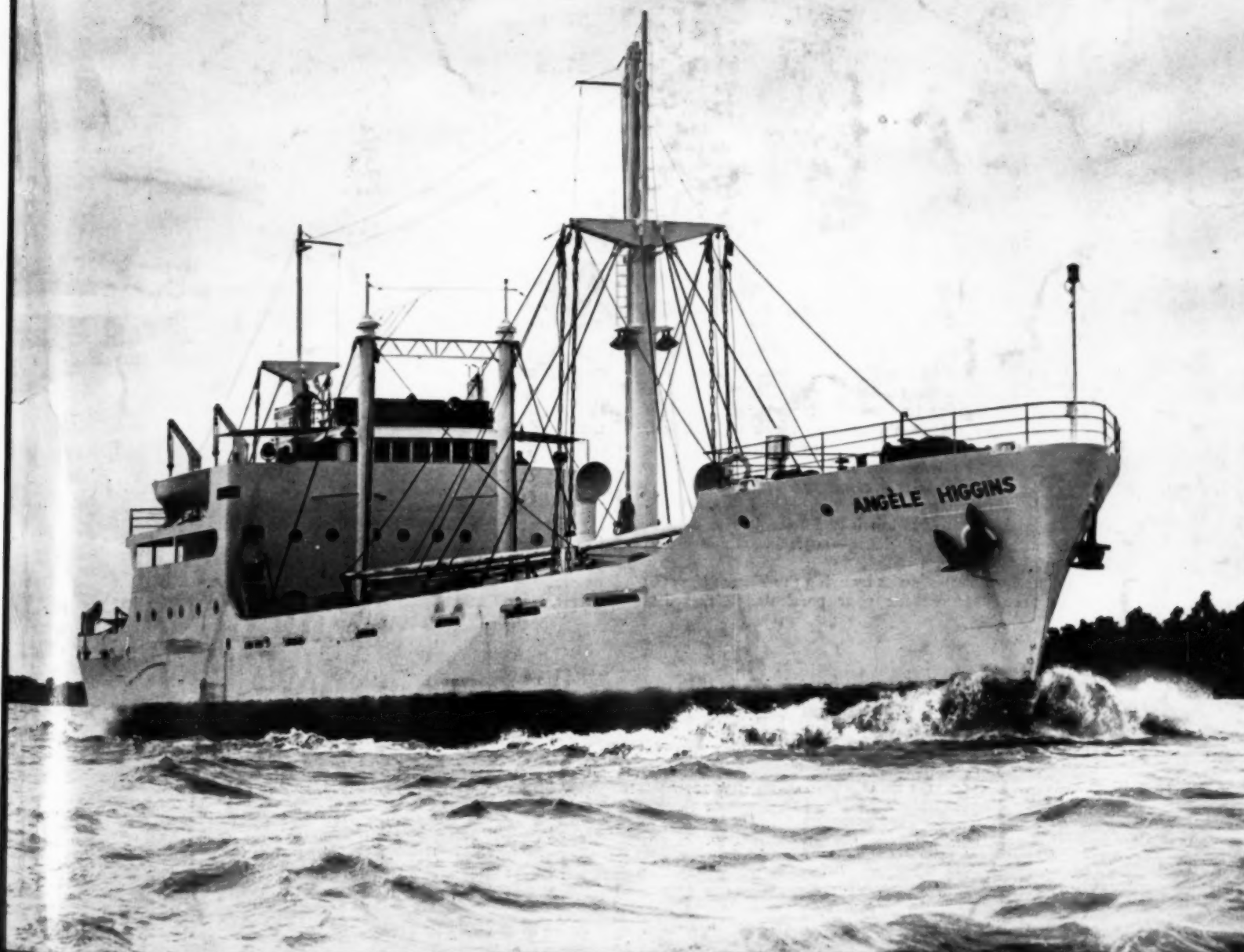
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MAY 1947

DIESEL *and* GAS ENGINE PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

REX W. WADMAN
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FRONT COVER ILLUSTRATION:
The "Angele Higgins," first of a special type of freighter designed by A. J. Higgins, Sr., of New Orleans, for ocean and river service. She is powered with two Enterprise Diesels, six-cylinder, 12 in. x 15 in., rated 500 hp. each at 300 rpm. This new type vessel is worth watching—a complete description will appear in the June issue of DIESEL PROGRESS.

DIESEL PROGRESS for May, 1947, Vol. XIII, No. 5. Published monthly by Diesel Engines, Inc., 2 West 45th Street, New York 19, N. Y. Tel. MUrray-Hill 2-7333. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London office at £1-17s per year.

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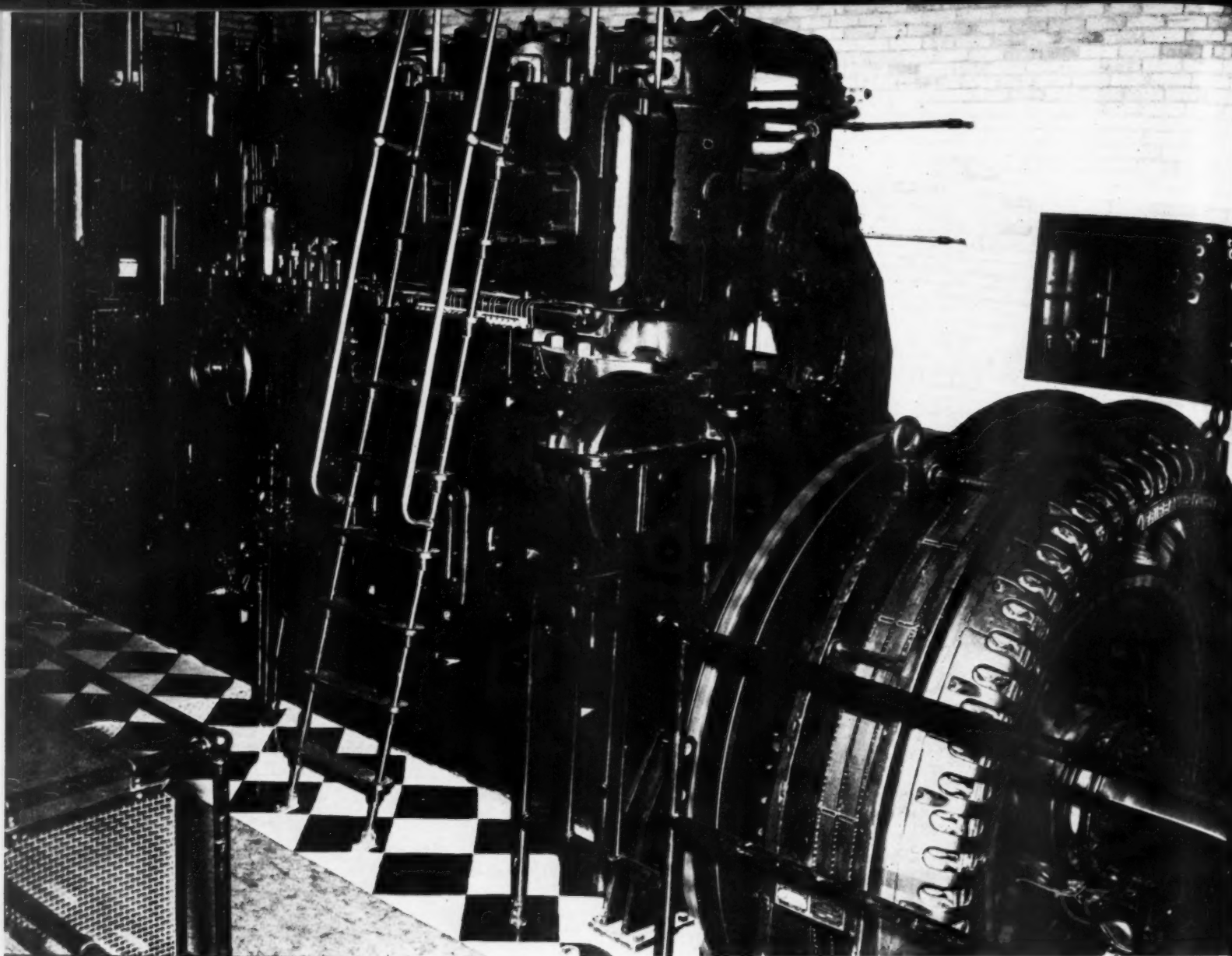
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The fourth and newest unit installed at Mountain Lake is this 1000 hp., 300 rpm. F-M Diesel and generator.

MOUNTAIN LAKE, MINNESOTA

By T. J. MALONE

TO most people in Minnesota the village of Mountain Lake, population 1,900, is known for one thing—prowess in basketball. Its high school team won the state high school championship in 1939 and every team since has been close to the finals. Basketball, engaging the enthusiasm of all the men, women and children in Mountain Lake, is more than a game to them. It is an expression of a way of life, of community loyalty and responsibility.

That spirit, common to grown-ups as well as children, enters into and helps to explain the success of the village's municipal Diesel electric plant. The plant began operating in July,

1935. It has grown from two engine units of combined 323 kilowatts rated capacity to four units of 1313 kilowatts, all of Fairbanks-Morse manufacture; from an output of 480,670 kilowatt hours of energy the first year to 1,571,730 in 1946.

The plant has handled its financial program with ease. Over-all investment as of December 31, 1946, amounted to \$233,574. This covered land, power house, heavy machinery, other equipment and distribution system. Except for about \$500 advanced at the outset as a loan from village funds, all financing has been done by revenue certificates, with payoffs from earn-

ings of the plant. A total of \$167,574 had been paid on the investment as of December 31 last and there were \$66,000 in revenue certificates outstanding.

The plant would have been clear of debt on August 10, 1946, but for the purchase of a new 1000 horsepower Diesel engine, put in operation the month before, and construction of an addition to the plant building to house that Diesel.

The achievement of building an initial loan of \$500 into a property valued at \$233,574, without depreciation, in twelve years, repre-

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This mod

sents teamwork on the part of the community, the village council and the three-member light and power commission. Teamwork? It's in the air! It begins early. You don't have to be in Mountain Lake long to discover that youth organization is a guiding principle in the community.

As for basketball—Mountain Lake takes to heart St. Paul's admonition, "So run that ye may obtain" and that other one to strive "not as one that beateth the air." Nearly every home with a growing boy, or girl, has a board with basket set up in the backyard, and much of Junior's spare time is spent right at home practicing shots, possible and impossible. No boy on reaching high school is asked whether he wants to try for the team; he has been trying for it since he was nine.

All this hasn't just happened. Mountain Lake, so named because of a lake near its site, long since drained, in which was a high flat-topped island, was founded in the early 1870's. It was settled by a colony of German Mennonites from Russia. They set the character of the town. Their descendants have continued it.

The village's first electric service was from a privately owned steam-powered flour mill. Another private owner then took hold, followed by a stretch of more than twenty years of energy

purchased from a transmission-line utility. After hard-fought litigation by the utility to block construction of a municipal electric plant the village began operation with a three-cylinder, 210 horsepower, and a four cylinder, 280 hp. Fairbanks-Morse Diesel engine and accessories.

Demand for energy rose so fast that in September, 1939, a third engine, of six cylinders and 450 horsepower, was put in operation. Addition of the fourth engine, of five cylinders, gave a combined 1946 horsepower with combined alternator capacity of 1313 kilowatts, divided 137 - 186 - 300 - 690. Woodward governors aid greatly in this close generation control. The peak load in 1946 was 520 kilowatts, which left a reserve capacity of 793 kilowatts.

Nearby residents were in no way bothered by this rapid expansion of the plant. Noise was reduced by the use of American Air Filter in-

take filters and a Burgess intake and exhaust snubber plus the Fairbanks-Morse exhaust silencers. The Diesel Service Co. steel cooling tower at the rear of the building did not detract from the surroundings.

Performance of the Diesel equipment is indicated in the table that follows. Operation at first was by fiscal years, November 1 to October 31 inclusive. Beginning with 1942, operation changed to a calendar-year basis. The first year in the table, November 1, 1935, to October 31, 1936, was the first full fiscal year of two-engine operation. The fiscal year next after that is given and then a jump made to the first full fiscal year of three-engine operation, November 1, 1939, to October 31, 1940. A fourteen-month period is next, November 1, 1940, to December 31, 1941, in which the adjustment to calendar year was made. Calendar years, beginning with 1942, are then set down in order. The table:

Year	KWH Generated	Generation cost KWH	Av. cost del. per KWH gen.	Av. rev. per KWH gen.	KWH per gal. of fuel oil	Peak load, KW.	Rated KW. cap'y
35-36	480,670	\$.	\$.0126	\$.0420	10.6	135	323
36-37	576,630	.0125	.0168	.0434	10.8	165	323
39-40	1,038,900	.0088	.0120	.0319	11.7	230	623
*40-41	1,375,400	.0090	.0123	.0320	12.6	350	623
1942	1,195,900	.0092	.0142	.0315	12.4	385	623
1943	1,224,000	.0090	.0164	.0307	12.5	385	623
1944	1,270,000	.0100	.0144	.0307	12.7	420	623
1945	1,361,000	.0090	.0141	.0305	12.9	430	623
1946	1,571,730	.0108	.0154	.0297	12.1	520	1,313

* 14 months period.

This modern building houses the Mountain Lake, Minnesota, municipal power plant.



Several factors account for the rise in the 1946 generation and total-operating unit costs. When the new engine was installed that year, the other three engines underwent a complete overhaul, more thorough than they had ever had before; also there were increases last year in fuel costs, freight rates and salaries. In the 4,214 days since the plant began operating, up to January 17, 1947, there have been only two entire stoppages of electric service, totalling 65 minutes. The first was in 1937, when the fuel screen became clogged and it took all of twenty minutes to locate and correct the trouble—"out of gas." Again in 1939, when the six-cylinder Diesel was being connected up, there was a 45-minute cessation of generation.

The fuel system is protected by a Briggs filter and the lube oil is under continuous filtration in a Honan Crane oil purifier.

What about consumer rates? Back in 1916, the utility had charged a top rate of 12 cents for all electric service. For half a dozen years immediately before the Diesel regime it had charged these monthly rates, applying to all kinds of service:

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First 100 kwh., 10 cents;
Next 100 kwh., 7 cents;
Excess, 5 cents.

The beginning municipal schedule in 1935 was, for residential service, monthly:

First 30 kwh., 8 cents;
Next 20 kwh., 7 cents;
Next 150 kwh., 3 cents;
Excess 2 cents.
Minimum, \$1.00

This was reduced after the top rate several years ago to the present schedule, which reads:

First 30 kwh., 8 cents;
Next 20 kwh., 6 cents;
Next 50 kwh., 3 cents;
Next 200 kwh., 2 cents;
Excess 1.5 cents.
Minimum, \$1.00

Schedules for other classifications have remained unchanged from the beginning.

For commercial lighting, they are: 50 kwh. at 8 cents; 150 at 6 cents; 300 at 4 cents; excess at 3 cents; minimum, \$1.00.

Power rates are: 100 kwh., 6 cents; 200, 5 cents; 300, 4 cents; 400, 3 cents; excess, 2 cents; minimum, \$2.00.

Rates are net, with a 10 per cent penalty for delayed payment.

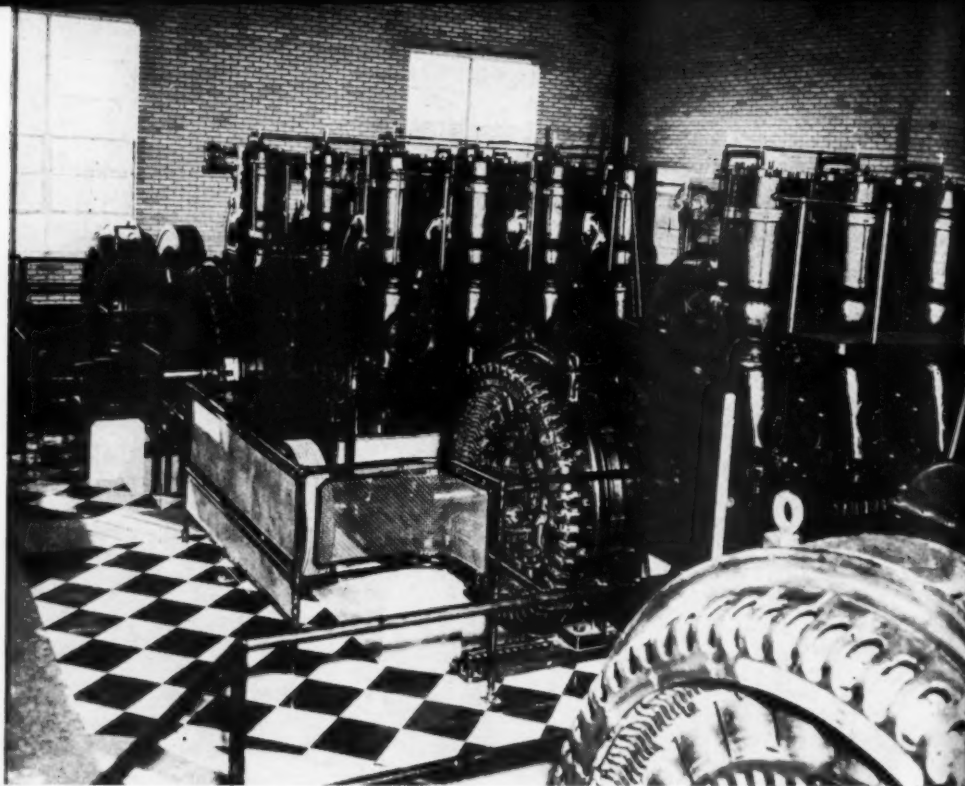
Major local industries using power include a locker and refrigeration plant, a creamery, a clothes-pin factory, two feed mills, two grain elevators, and two machine shops doing farm-equipment repair.

Among so-called "free services," which are free only in the sense that direct payment is not made for them, as the plant absorbs the cost, are: village water pumping; lighting of public structures, as village hall, street commissioner's warehouse, public library, lighting of school football and softball fields and village ice skating rink; powering the fire siren.

All consumers' bills for December, 1945, were cut in half, as a good-will gesture, the saving amounting to about \$2,045. In lieu of such a cut in 1947, all street lighting will be given free, "on the plant."

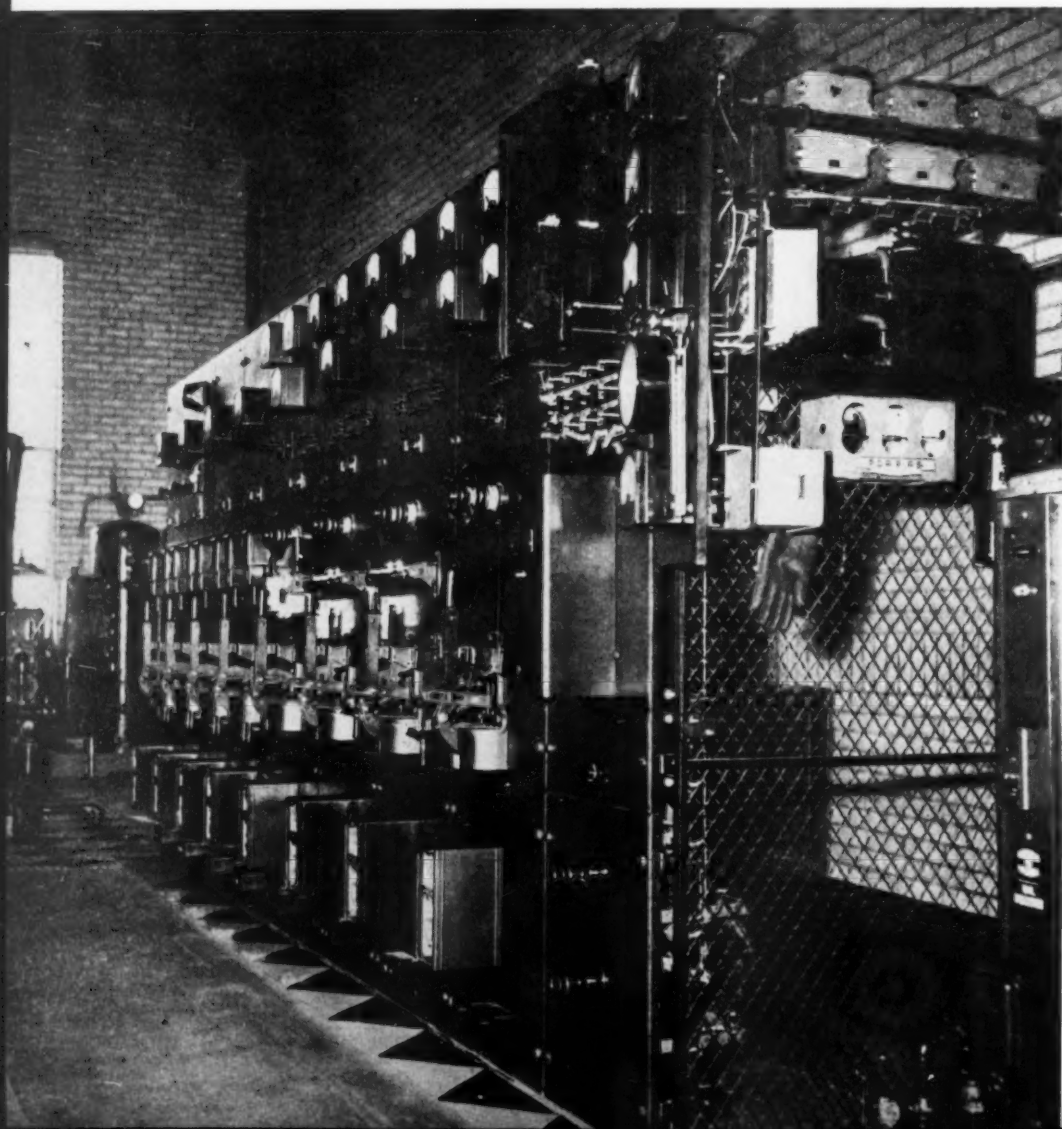
Early this year the local telephone company changed from manual to automatic dial system. With a central switchboard no more, the electric plant took on a police and fire alarm signal service.

A sound-proof telephone booth was installed in the power house. Calls for police or fire-department are made to the plant direct. For a police call, the operator on duty blinks the street lights as notice to day or night marshal.



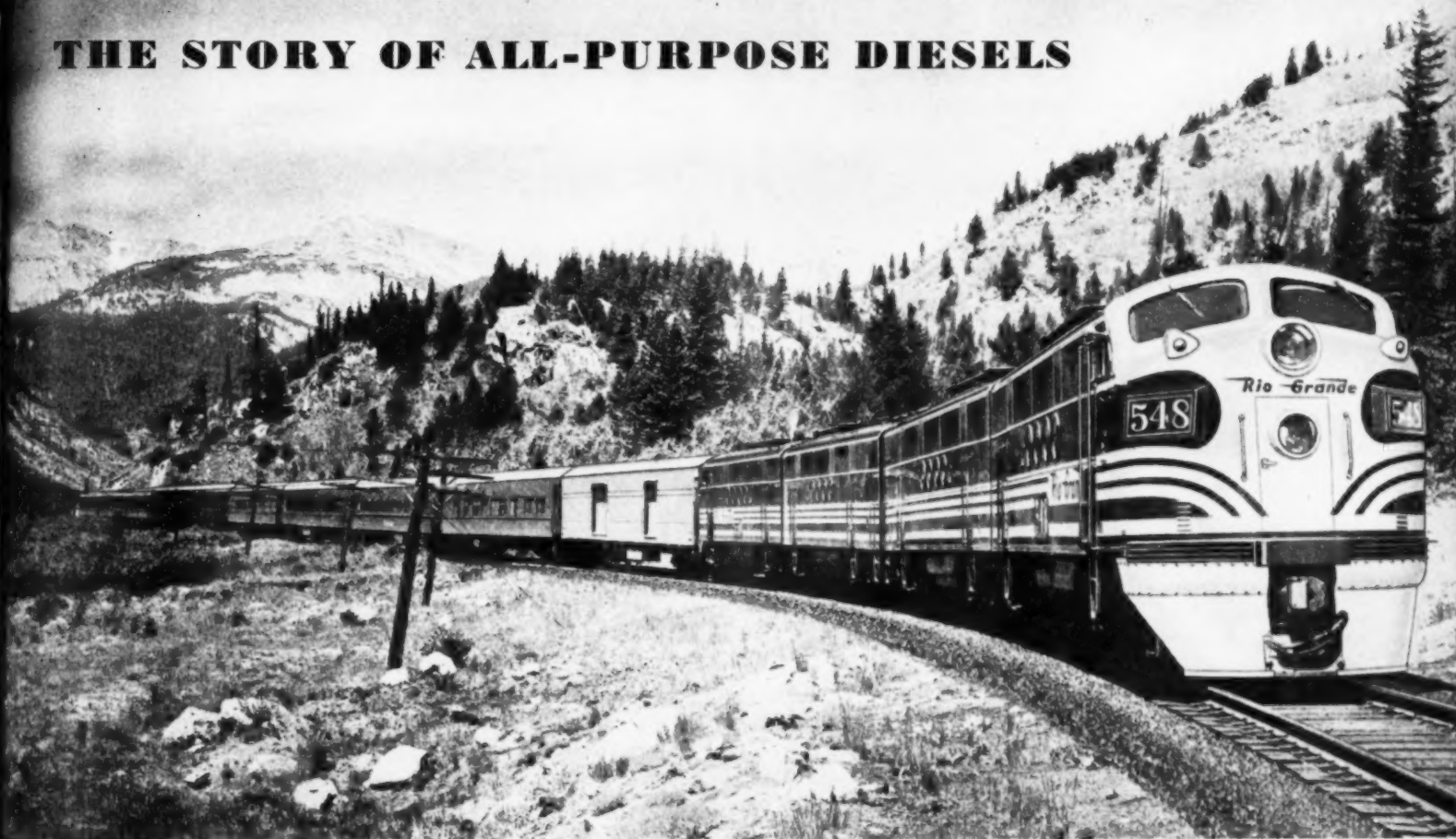
First three units installed at Mountain Lake, a 3 cylinder, 210 hp.; a 4 cylinder, 280 hp.; and a 6 cylinder, 450 hp.—all F-M Diesels and generators.

General Electric switchboard comprised of one station panel, 3 outside circuit panels, 4 engine panels and swinging bracket panel.



RECORDS ON THE RIO GRANDE

THE STORY OF ALL-PURPOSE DIESELS



By CHARLES F. A. MANN

IN 1944 the Denver and Rio Grande Western Railway put heating boilers and extra-size water tanks on its new 5400 hp. Diesel-electric freight locomotive, a standard model Electro Motive 4-unit job known as DRGW 548. This is believed to be the very first freight Diesel locomotive rigged out for passenger service, and the actual forerunner of the all-purpose Diesel road engine.

Since that time three more 5400's have been equipped with passenger controls and heating boilers. These were also of the 1944 vintage, being known as No.'s 549, 550 and 551. Late in 1946, three more 4-unit General Motors Diesels, the first full-blown F.3 Models, rated at 6,000 hp. with their new ac and dc generators, dynamic brakes, compact radiator blowers and spiffy new simplified electric switching and control panels, were placed in service. Thus the Rio Grande now has seven 4-unit

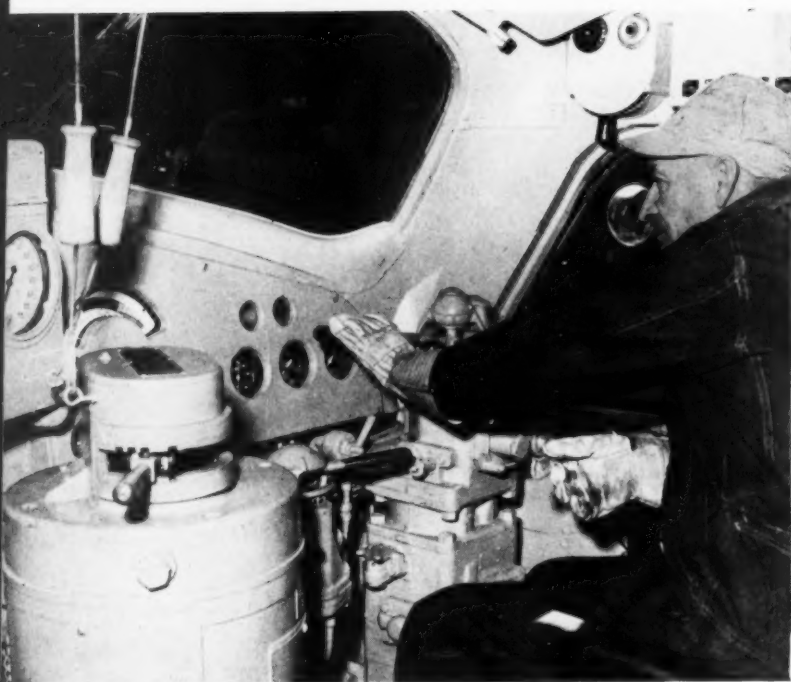
Road Diesels equipped to operate either as big size 4-unit locomotives or as 14 half-size Road Diesels, powerful enough to haul up to 7 or 8 cars on a tight schedule.

Geared for 65-75 mph., the top comfortable speed on this 570 mile Denver-Salt Lake mountain racetrack, this fleet of all-purpose Diesels is now running up magnificent performance records on two of the road's nationally-known passenger trains, the two Exposition Flyers, the through Chicago-San Francisco trains and the bright little Prospectors, those fast overnight trains that race over the Rockies and through Moffatt Tunnel between dinner and breakfast, as regularly as clockwork. With the arrival of two big 6,000, 3-unit Alco-GE Diesels expected by the time this is published in DIESEL PROGRESS, and a revamping of through freight and passenger schedules, the Diesel motive power inventory of Rio Grande will

permit practically 100% Dieselized operation of all trains using the Moffatt Tunnel Route, and permit the complete abandonment, when final acquisition of the Denver and Salt Lake railroad is made, of all mainline steam power.

Seven more 5400 hp. EMD Diesel road locomotives, purchased in 1942 and 1943, with dynamic braking, but not heating boilers, give the Rio Grande a pool of fifteen big 4-unit Diesels to use in freight service. The seven mentioned earlier in this story being dual-purpose Diesels, which, together with the two big Exposition Flyer Alco-GE Passenger engines, give the road nine road passenger and eight strictly freight, or a combination of fifteen that can be used for freight and two geared for passenger work only.

Late this Summer, the new Exposition Flyers, renamed the California Zephyrs, will race



Control Station on one of the Rio Grande's newest General Motors F-3 Diesels.



Close-up of No. 552, one of the newest All-Purpose F-3 Diesels. One of these 6,000 hp. locomotives is split into two separate locomotives for service between Salt Lake and Denver.

through on the Burlington from Chicago to Denver; change to Rio Grande power from Denver to Salt Lake and utilize Western Pacific Diesels from Salt Lake to San Francisco, each road in the three-line California route furnishing its own Diesel locomotives. One thing governs all these fancy transcontinental streamliners—boiler water storage capacity—the current hitch so far as Diesel is concerned. However, the new Alco-GE Diesels carry 4500 gallons of boiler water and 2,000 gallons in auxiliary tanks—6500 gallons in all, just for the hotel load in the coaches.

It is interesting to note the increase in water storage capacity on the Rio Grande Diesels. No. 548 started out with 1080 gallons in each 2-unit locomotive section. Road Diesels would thus have a boiler water capacity of 2160 gallons. The next three that were modified for passenger service carried 1230 gallons of water in each 2-unit hookup or 2460 gallons for the four-unit, full-size Diesel. The 1947 F-3 Diesels carry 1700 gallons of water for the 2 unit jobs or 3400 gallons for the 4-unit locomotives, or an increase from 2160 to 3400 gallons of water in just 3 years.

Water, water, water—everywhere this department goes we find operating people yowling for "more water" on their Diesels. In the giants of steam power, where a bungalow-sized tender

could carry 30 tons of coal and 25,000 gallons of water, this wasn't a problem. But the hotel load on Diesel passenger trains causes concern with its cry for more water. One of the chief reasons for building 6-wheel passenger trucks under the longer passenger Diesel cabs seems to be solely to provide axle capacity to carry more water.

The Rio Grande now uses one of the F-3's split in half to provide two-way nightly service out of Denver and Salt Lake on its prospector trains—neat Coach-Pullman trains with a quiet little diner-club car in the middle and a 3-way combination baggage-mail-dormitory car at the head end. The F-3 3,000 hp. 2-unit jobs carry them nightly at 28 to 35 miles per hour up the big hill out of Denver, to Moffat Tunnel, without a murmur. The extra wide, very roomy cabs, with full dashboard control for the heating boiler, and the new electric control system, motor powered fan and traction motor blower system, provides, with the dynamic brake, equipment that answers the railroader's prayer on this run. With high tractive power at hill-climbing speeds, this 2-unit job can leave Denver or Salt Lake with 7 cars an hour late, and run into the Terminals exactly on time. Once over the Wasatch Range in Utah or the Rockies on the Denver end, the train can race across the high Colorado Plateau at an even 75 miles per hour, with not one stop for water,

fuel or sand all the way . . . only boiler water at Grand Junction. Sometimes one extra stop is made for boiler water in case the temperature drops down to 40 below over the Rockies, and the heat is running full blast. A single 2800 lb. Vapor Car Heating boiler on the B units provides the heat. Water is stored in a small tank on the A units and a larger tank on the B units, to give the 1700 gallon capacity.

On the 12-14 car Exposition Flyer trains, the F-3's provide perfect power for a schedule that is almost impossible to make with steam, without double heading over long sections. The sharp curvatures back of Denver, in the Glenwood Canyon and through the Wasatch Range, make easy going for the short wheel-base F-3 Diesels. When the big 6,000 hp. Alco-GE Diesels arrive, it is expected to Dieselize the overnight Mountaineer Trains—the Denver-Grand Junction workhorse mail-baggage-express coach and sleeper trains that serve the whole of central Colorado. Diesels will then be available for use on all freights as well. Three 5400's are now necessary to protect the Exposition Flyer trains, but only two Diesels will be necessary to maintain the service when the train becomes California Zephyr on the faster schedules. Plans now are to run from Denver to Salt Lake from sunrise to sunset in summer to see the whole vast "Scenic Line of the World" from Vista Domes. Two 6,000 hp. Diesels for

Generator

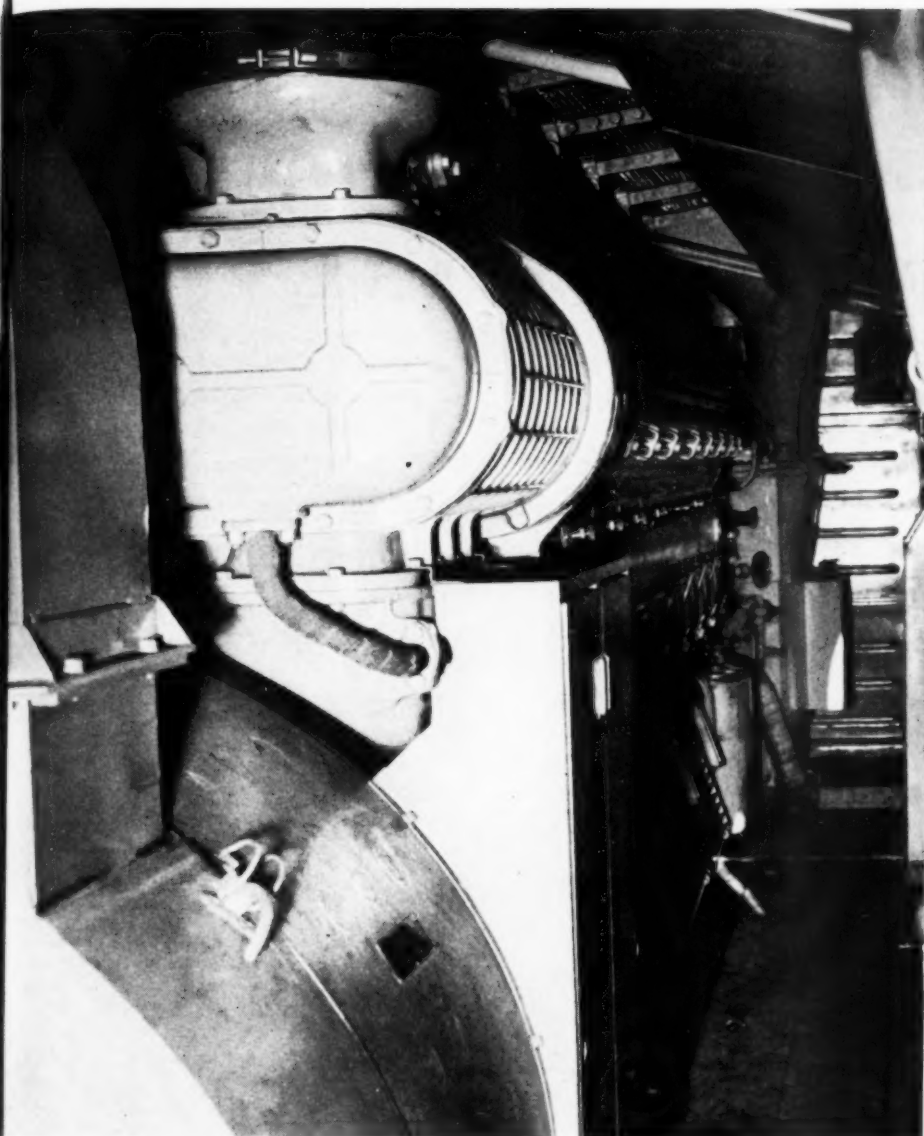
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Generator end of 16-cylinder, 2-cycle, 1500 hp. Diesel installed in one unit of the 4-unit F-3 Diesel locomotive.

the Zephyrs; two 3000 hp. Diesels for the Prospectors and two 3000 hp. Diesels for the Mountaineers, and perhaps three 6,000 hp. Diesels for the Royal Gorge Flyers—six 6,000 hp. Diesel passenger locos to run all four of the Rio Grande's crack through trains. Which is just about what their management was shooting at four years ago when they decided to go Diesel. It should be recorded here that were it not for upsets due to change in gear ratios, the Rio Grande would have been the world's first railroad to get the all-purpose F.3 Diesels, but Santa Fe got them first—and it was but a matter of weeks between the delivery times for both railroads. However we assign a "first" in the all-purpose race to the Rio Grande, because it was first to quietly develop a freight-passenger Diesel . . . and no gear ratio changes were necessary either, on the DRG & W.

MAY 1947

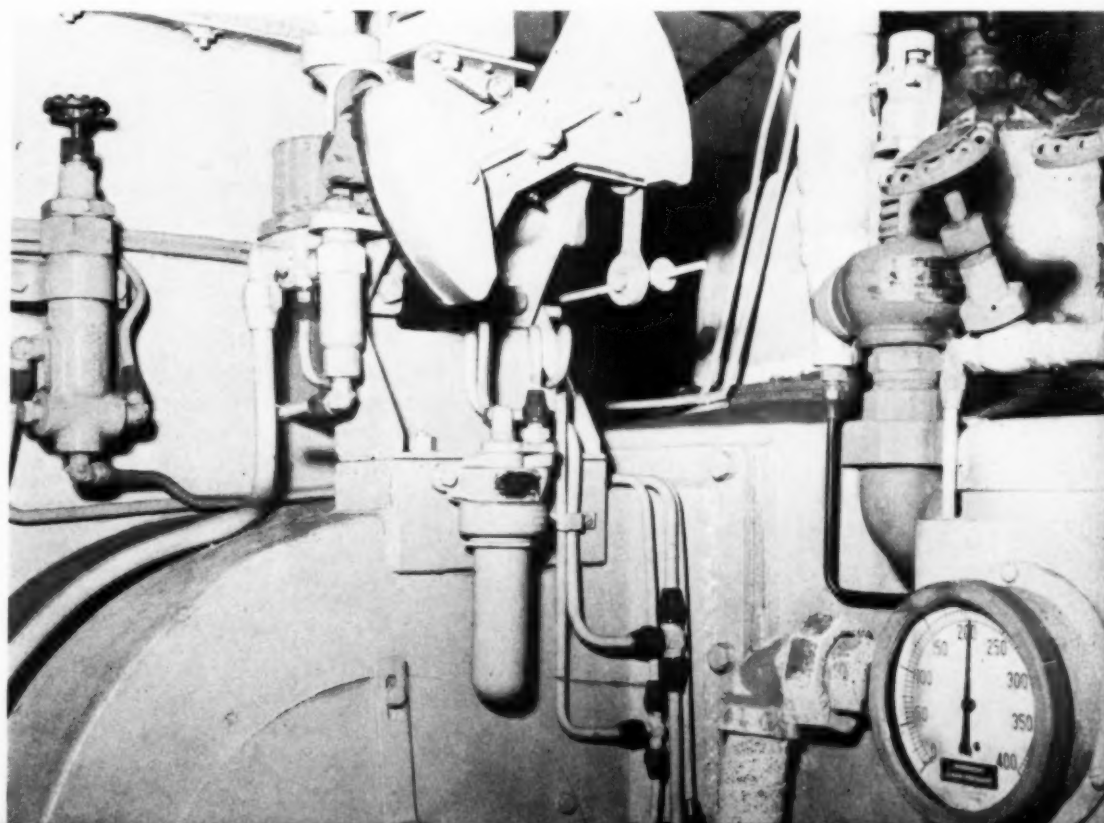
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Fifteen years ago the Rio Grand was not known for punctual schedules. Now if 80 or 90 per cent of the daily schedules aren't on time, the employees even get mad! Today's performances would be impossible with steam power. The topography, competitive Terminal times and the fact that instead of being an isolated Mountain system, it is now a vital link in a 3-system Transcontinental line, simply rule out steam for fast performance. Ultra high speeds are impractical on the Rio Grande. Sustained medium and medium high speeds are its operating norm. So, one by one, big steam on the Rio Grande gets coated with lead paste and thick grease, and is silently stored for the indefinite future. They're now even talking about whitewashing the inside of Moffat Tunnel.

On one typical Daily Report it is interesting to observe that whenever a Diesel engined train is anywhere up to an hour late from Denver or Salt Lake, it is "On Time" at the end of the run. But with steam power it is still late!

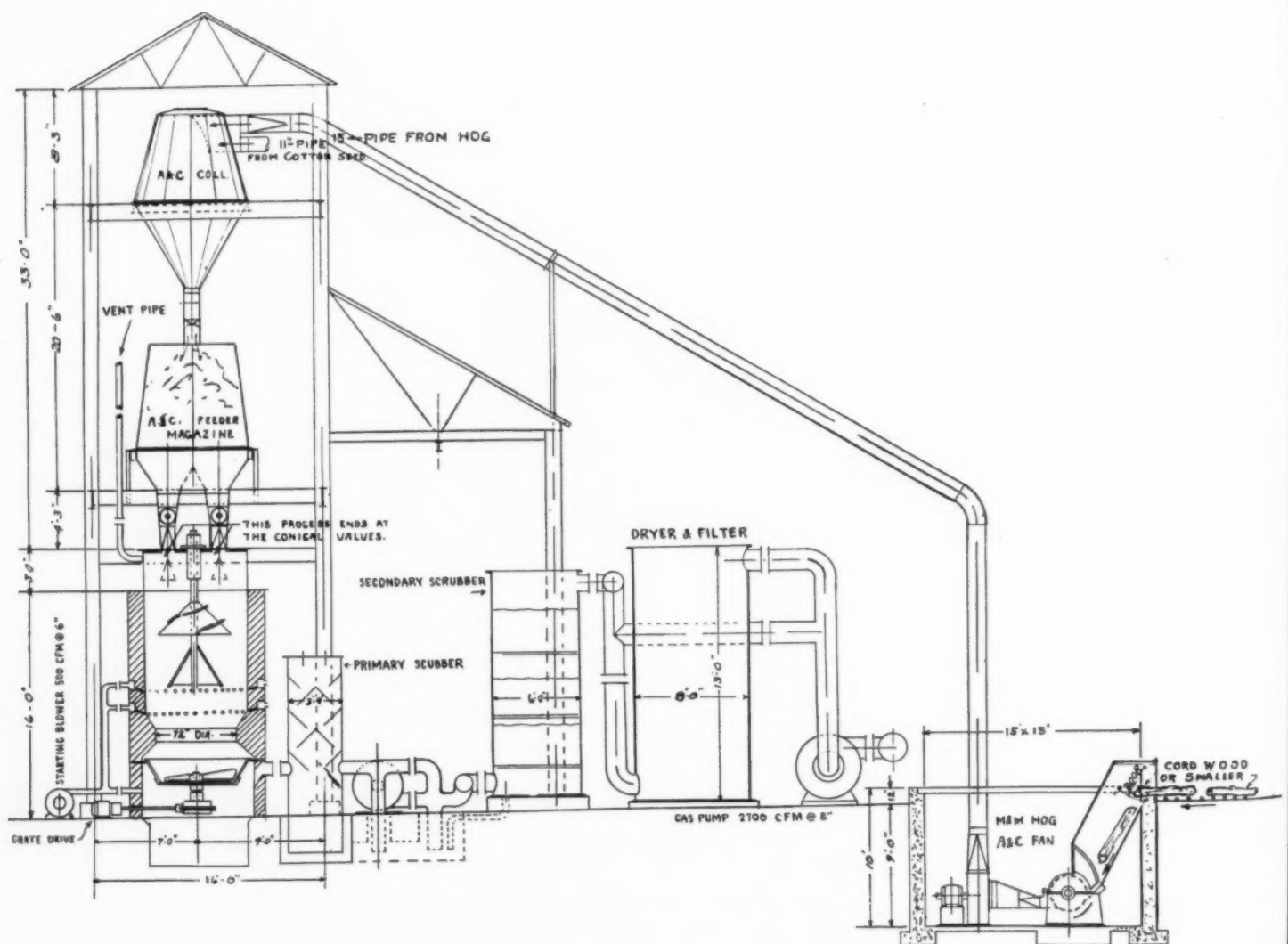
It has been observed that on the curvaceous Western railroad systems, the 4-wheel truck and short 48-ft. cab are ideal. Then it has been said that on single-track lines, typical in the West, it is vital to run trains at as near even speed as possible—none too fast or none too far below a sensible norm. So, with the advent of an all-purpose Diesel that will haul freights at 25 to 40 miles per hour, or lighter passenger trains at from 35 to 65 miles per hour, the future points to a buildown of motive power to two simple models: The 1,000 hp. switcher and the 1500 hp. road unit that can be used for everything outside the terminals.

Vapor Car Heating Boiler in one of the "B" units of the F-3 Diesel. This boilers supply 2800 lbs. of steam per hour.



NEW GAS PRODUCER FOR DUAL FUEL ENGINES

By LUDWIG LUSTIG*



Line drawing of typical dual fire-zone gas producer operating on downdraft principle. Ground-up waste vegetable matter is conveyed to a feeder tank where it is fed into the gas producer. The air-actuated center tube rotates and spreads fuel evenly. The two fire zones (denoted by the two sets of inlet ports) support complete combustion. Gas formed passes through revolving grate to the scrubbers for cleaning and cooling.

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THE future of the dual-fuel Diesel engine is very bright. Its economy and efficiency have been proven. Its application in regions where low cost natural gas or coke-oven gas is available seems certain. But now a new development is underway to make the dual-fuel Diesel independent of the gas resources of any given geographical location. The answer is found in a new type gas producer which will convert a variety of vegetable waste products into combustible gas suitable for use in a dual-fuel engine with only a relatively small amount of pilot or Diesel fuel to start combustion. Such waste products include corn cobs, rice hulls, sugar-bagasse, cotton pods, coffee bean skins and husks, olive pits, coconut shells and innumerable other waste vegetable products which are entirely worthless to the producer and even create a formidable disposal problem.

Wellman Engineering Company of Cleveland with the writer acting as consulting engineer, has recently built one of these new double fire-zone gas producers which has successfully produced gas from wood shavings, corn cobs and cotton seed waste. Gasification, of course, is not new, but this modern gas producer with its internal gasification and the cracking of all tarry heavy hydrocarbons introduces some novel and interesting features.

The main features of the Wellman Gas Producer can be seen from the drawing on this page. Essentially it is a downdraft gas producer with a 72 inch inside diameter at the narrowest diaphragm below the two ring channels. It has a capacity of 30 cfm./sq.ft. or 860 cfm. total or 51,600 cu. ft. per hr. The average heat contents for cooled and purified gas from air dried waste products with 15 to 20 per cent moisture content is 135 btu./cu.ft. The hourly gas production results in an approximate heat equivalent of 7,155,000 btu. The average heat value of these waste products is 7,000 btu./lb.

The efficiency of the gas producer is from 70 to 75 per cent. Taking the lower figure as an average the equipment will consume approximately 1,425 lbs./hr. for the above indicated performance.

A low pressure gas engine consumes 10,000 btu./hr., while a dual-fuel engine on the Diesel cycle only requires 8,000 btu./bhp./hr. or 20 per cent less than the gas engine. The manufacturers of dual-fuel engines request a minimum of 22 per cent of the required btu. in the form of pilot fuel. The balance, or 6240 btu.'s

* President, Diesel Dynamics Corporation, New York.

can be supplied in gas form, or, translating it into terms of waste products 1.3 lbs./bhp./hr.

The drawing on this page shows a gas producer designed for the utilization of cotton-seed waste and hogged wood. These combined waste fuels are pneumatically conveyed into head storage bins and worm feeders, which prevent any stoppage of fuel. The downdraft gas producer is seen with a center tube equipped with air fed stirring fingers. This center tube has an air regulating valve and has one rotating ratchet movement, combined with an axial cam movement to prevent arcs and pipe holes in the equally spread fuel. The upper, or first fire zone obtains its air supply by suction, (this is started by a positive pressure blower). In this first fire zone we have an ordinary combustion process as per formula: $C + O_2 = CO_2$ plus the release of half-burned charcoal and other heavy hydrocarbons which then pass to the lower fire zone. The construction of the first fire zone includes the ring channel which has calibrated air inlet valves and radially arranged air nozzles around the refractories. Each ring channel is equipped with a pyro-element to check and regulate the combustion process. The second lower ring channel fire zone receives the charry residue of the upper zone and supports the reduction of the foregoing combustion as follows $CO_2 + C = 2CO$. As a supporting process, the moisture of the fuel together with the vapors from the ash is split according to the formula: $H_2O + C = CO + H_2$. The gas is therefore mainly a mixture of CO and H_2 and some CH_4 with a balance of nitrogen and unconverted CO_2 . The ash which contains perhaps $\frac{1}{2}$ of 1 per cent unburned material is mainly potash and can be used chemically.

The grate is of the revolving step or collander type, depending on the type of ash. The water filled ash sump can be cleaned without interruption of gas production either manually or by means of worm conveyors. From the gas producer the gas is conveyed to a cascade washer and from there through a centrifugal washer into a scrubber which is filled either with coke of various sizes or with ceramic "Raschig" rings. From this scrubber the gas is drawn into a step cleaner with several stages of charcoal of various grain sizes and with one stage of glass-wool filters. The gas pump draws the entire gas quantity through the gas producing and purifying system into the main manifold of the power gas line. Since the intake suction of Diesel engines equals approximately $1\frac{1}{2}$ inches of water, it is customary to deliver the gas with approximately that pressure.

All cleaning and purifying apparatus are so bypassed with gate valves and interconnected that each unit can be cleaned at intervals without disturbing the active operation of the plant. The gasification is so complete that test filters show no evidence of oil or tar vapors in the gas. The washing water from the scrubbers has a slightly phenolic smell but is otherwise quite pure. The water consumption for the pictured plant (cooling and washing of gas) is 50 gpm.

For use in dual-fuel engines on the Diesel cycle the air mixing valve is set to admit 1 part gas to 1.08 parts intake air. This is compared to a 1:5 ratio when natural gas is burned. However, the differential in the cost of fuel makes quantitative comparisons seem unimportant. It has been estimated that a stand of Eucalyptus 750 x 750 yards would supply enough fuel to operate a 800 hp. dual-fuel engine all-year-round year after year. The fast-growing Eucalyptus would replenish itself just as fast as it was cut. It would be a prime example of converting sun power to mechanical power.

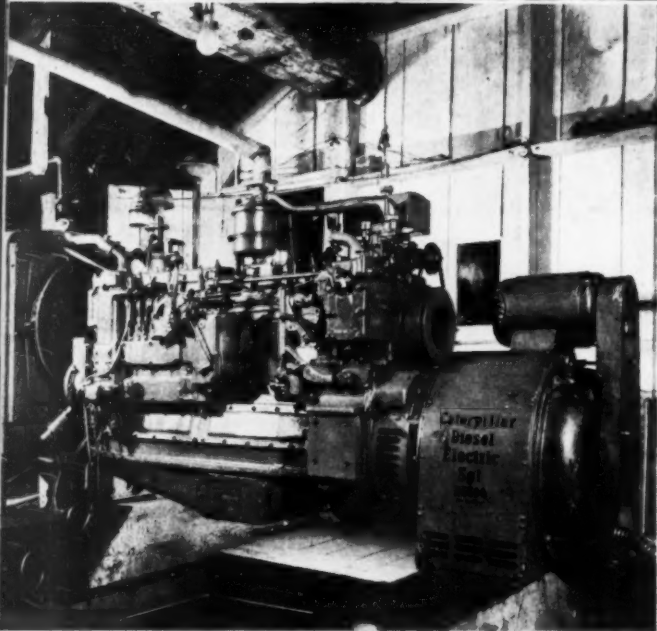
The tests that were made on this gas producer by the Wellman Engineering Company were of long duration. Quantitative and qualitative analyses were made of the producer gas, and a long series of actual engine tests were carried out using a Bruce MacBeth engine of the 4 cycle type. All these tests were eminently successful and have prepared the way for manufacturers of dual fuel engines to take an active interest in this new field which shows good prospects for development in areas of the world where vegetable waste as a by-product of agriculture processing is readily available. As evidence of interest shown by other nations, Brazilian engineers attended the tests made on this gas producer, anxious to find an efficient means of utilizing waste vegetable matter. Our own experts representing the motor fuels section of the U. S. Dept. of Agriculture were on hand for the tests.

This development opens up new fields for the dual-fuel Diesel throughout the world. For the coffee planter and processor of South and Central America, for the sugar growers of the Caribbean, for the jute processor of India or for any number of agricultural producers all over the world, this development opens new possibilities for power production right on the spot utilizing the waste by-products of the crop. With a dual fuel engine requiring only $\frac{1}{5}$ of the liquid fuel needed for straight Diesel operation and with low cost gas making up the difference in Btu.'s it looks like a paying proposition.

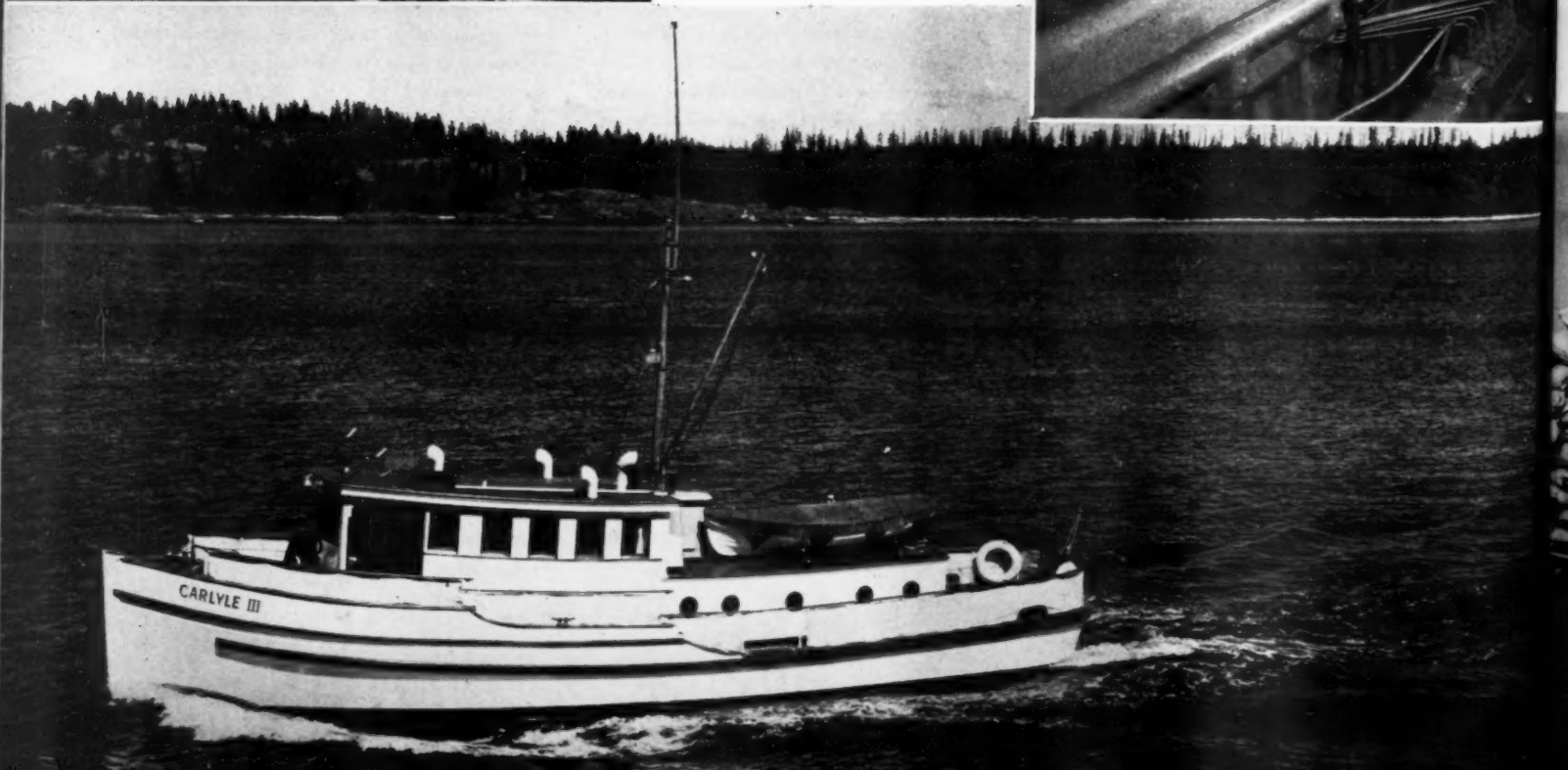
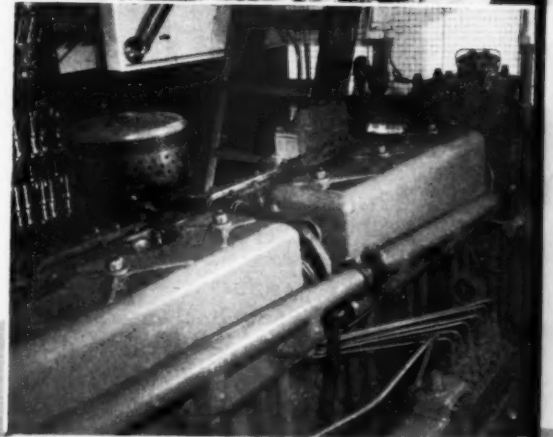
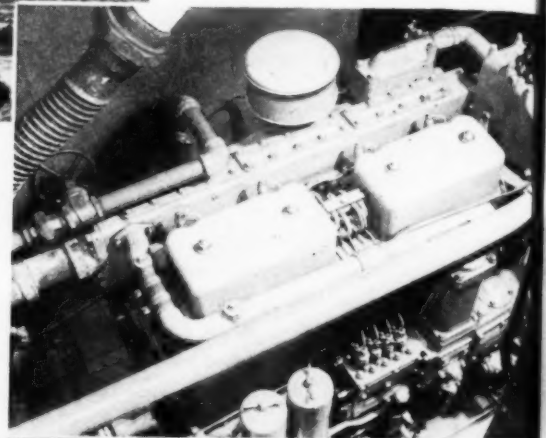


THE BOOMBOATS OF COWICHAN

(Left) Boomboat "Westminster Boy" operating on Cowichan Lake, Vancouver Island, British Columbia. She is 45 x 11 feet.



(Left) Shore-based Caterpillar Diesel drives 37½ kva. generator to supply light and power for Lake Logging and Lumber Co. Ltd. of Rounds, B. C. (Upper right) Caterpillar Marine Diesel installed aboard "Westminster Boy." The Diesel turns a 4-foot wheel. (Lower right) Caterpillar Diesel installation aboard the "Carlyle III" which has driven the boat 10,500 miles during the past year. (Below) "Carlyle III" 52-foot contact boat operated by the Finning Transportation and Equipment Co. of Vancouver, B. C.



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DIESELS LICK THE ARCTIC

Editor's Note: The article that appears below is reprinted from CEC Bulletin, March, 1947. It was originally prepared from reports submitted by Commander P. W. Roberts, CEC, USN and contains much factual information concerning Diesel operation under Arctic conditions.

THE history of Arctic exploration is punctuated by the deaths of intrepid men who were caught away from main bases with inadequate transportation and shelter.

Frobisher, Hudson, Peary, Amundsen, Franklin, and Greely, are names familiar to students of Arctic regions. Some of those men died searching for the North Pole and the fabulous Northwest Passage. Others, like Peary (one of the CEC's first and most famous officers), were crippled physically as a result of their experiences. In each disastrous case, though, the story was the same. Men died from hunger and exposure when transportation facilities failed and left them to the mercy of some of the world's most rigorous weather.

But the converse is true today. During the past 3 years, the 1058th Seabees and civilian employees of BuDocks contractors, assigned the job of hauling supplies across Arctic wastelands to Navy outposts, developed techniques which enabled freight sledtrains to make routine, unsupported trips up to 300 miles from terminal base, hauling hundreds of tons of heavy equipment each time. Men slept and cooked meals on these trains, worked 15-hour shifts, and even put on weight. Considerable data was obtained from these journeys. Terrain, weather,

wear and tear on clothing, machines and personnel underwent close study.

Never Ignore the Weather

Weather is the most important single factor to consider before undertaking any work in the Arctic. It usually is necessary to halt all operations when an Arctic storm strikes. They bring low temperatures and strong winds that carry so much snow in suspension visibility is reduced to a few feet. Unable to see ahead in such storms, men have been known to perish only a few yards from shelter. Even under best weather conditions it is not possible to prepare a freighting road in advance of sled-trains because constant winds "blow in" roads a few hours after they are bulldozed out.

Traveling On Ice

Snow-covered terrain sometimes is treacherous because blown snow makes uneven ground appear level. The snow covering is not crusted strongly enough to permit a safe bearing surface for heavy loads, and dangerous ground depressions and humps cannot always be detected in time to be avoided. Where thorough scouting can be accomplished well ahead of a train, overload travel is sometimes the most practical, depending on the nature of the terrain. However, time and equipment can be saved, in most cases, by following well-defined, ice-covered river channels, even though it means covering greater distances than a direct overland route would require. Although ice travel is smoother and faster, the narrow, winding rivers on the Arctic slope form wide sand bars and deep

snowdrifts near their banks. These make it necessary either to pull sled-trains across sand or doze out accumulations of 10 to 20 feet of snow, which is soon piled up again by winds.

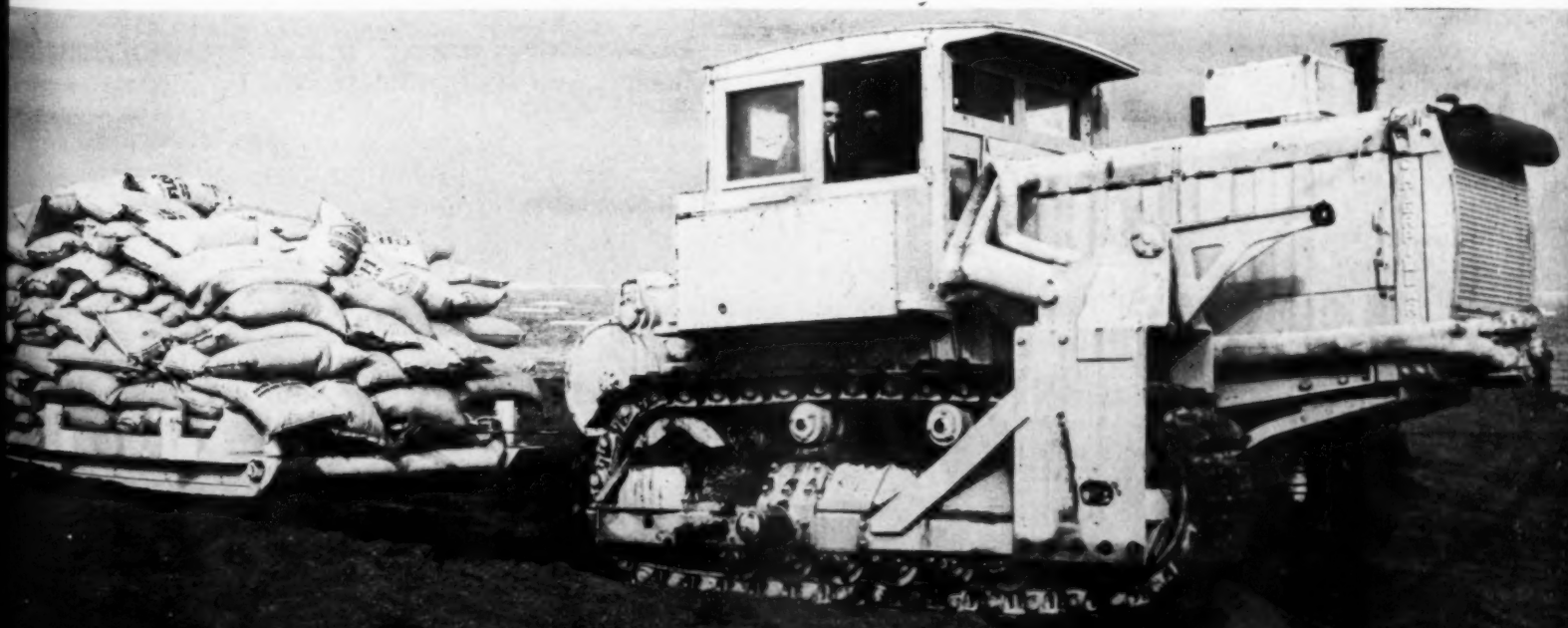
The extreme cold makes thick ice, affording safe and excellent sledding surfaces. Any ice sheet along the northern Alaskan coast is thick enough to support the heaviest caravan. Last year, salt-water ice along one shore was measured at 63 inches, while fresh water ice on a river averaged 54 inches thick. When crossing large expanses of ice, contraction cracks often will be encountered. They appear when the ice sheet contracts as the temperature drops, exposing the water, which quickly freezes solid. The result is a sunken, wedge-shaped crack sometimes over 4 feet wide and deep, and dangerous to cross with tractors and heavy loads.

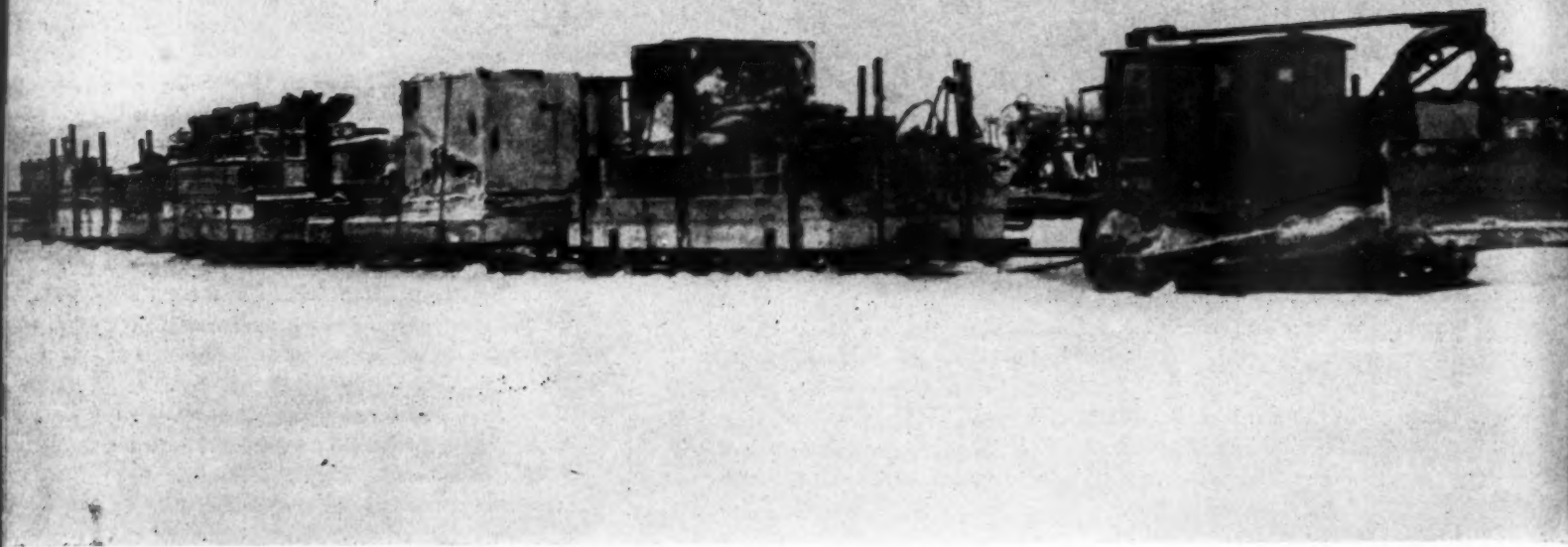
Contraction cracks usually can be skirted by detouring toward shallow water, where ice is frozen to the mud bottom and does not contract. Traveling speeds as a rule varied widely with trail conditions. Approximately 5 miles per hour was the average on any length of haul. Under difficult conditions progress was as little as 5 miles a day.

Organizing Trains

The longest regular haul made by Alaskan freighting teams was a little less than 300 miles, one way. On long hauls, 2 "cat" trains were used. Each train contained 5 caterpillar D-8 tractors, 1 cookhouse wanigan (a wooden,

Caterpillar tractor towing "Go-Devil," an all-welded steel pipe sled. It is effective on sand and packed snow but no good in deep snow because of sled's low clearance.





This heavily laden, weather-beaten sled train typifies Alaskan winter freighting. The average speed is about 5 miles per hour.

caboose-like hut on runners), 1 sleeping house wanigan, 1 "Go-Devil" (a low-slung, all-welded, steel-pipe sled) with emergency shop equipment, and 12 to 16 heavy-duty bob sleds (known as Michler No. 9's) and Go-Devils. Lead tractors dozed the trail and hauled wanigans and shops. The other four tractors in each train followed, pulling loads varying from 15 to 30 tons per sled, depending on type of cargo, trail conditions, and weather.

Each crew consisted of five cat operators, one oiler, one cook, and a foreman. Sleeping wanigans each accommodated eight men in double bunks. Mess wanigans seated an equal number. Crews worked 15 hours a day, with half an hour for lunch and supper. A light lunch usually was provided when the tractors stopped at night.

Other regular hauls did not exceed 70 miles one way. Trains on these short hauls were smaller and preparations for the journey less elaborate. On one 75-mile run, two tractors usually were used, each pulling two heavy-duty Michler bob sleds or three Go-Devils. Since the terrain was considerably rougher in this case, sleds carried lighter loads than usual. Wanigans were not used because the trip was short and there was considerable air travel back and forth. A rest stop was established along the way to which the supplies were moved by one crew and relayed onward by another stationed at the destination.

Because of a shortage of D-8 tractors, crews making still shorter runs of 50 and 55 miles utilized 6 x 6 GMC trucks and M-4 tractors.

It is possible that this was the first time trucks were operated for such work. They carried 5- to 6-ton loads. Each M-4 usually towed three Athey wagons (heavy-duty stake platform trailer on tracks) or two sleds on these hauls.

Trail Blazing

Trails were laid out ahead of lead tractors by scouting parties in Weasels. Red flags usually were placed at half-mile intervals, while scouts worked up and down the trail reflagging doubtful places. When weather permitted, a ski-equipped airplane made daily flights over trains making long hauls, delivering mail, and checking trail conditions. When necessary, the pilot remarked trails by dropping weighted flags. Statistically speaking, the 1946 winter freighting operations looked like this:

Hauling method	Tons hauled	Miles	Ton-miles
Tractor-sled	2,531.61	286	724,040.46
Do	307.30	49	15,057.70
Do	126.00	55	6,930.00
Do	449.18	65	29,196.70
Subtotal ton-miles			775,224.86
Truck	440.64	49	21,591.36
Do	235.94	55	12,976.70
Subtotal ton-miles			34,568.06
M-4, sled, and Athey wagon	540.26	49	26,472.74
Tractor-sled	44.40	79	3,507.60
Subtotal ton-miles			29,980.34
Total ton-miles			839,773.26
Total tons hauled....	4,675.33		

Last year's winter operations consisted mainly of supplying men and equipment to construct and maintain camps and air strips, and included 2,400 miles of sled freighting by tractor trains over terrain never before traversed by anything but a few Eskimo dog teams. Temperatures under which operations were conducted dropped below zero intermittently

through a period of 8 months and remained below zero for 5 of them.

Equipment

Subzero weather is especially destructive to machines because of the high rate of wear. The men in Alaska found out the hard way which were the best sled designs and tractors needed for snowborne freighting. They learned that prime movers must, above all, be dependable before they could be considered satisfactory for Arctic freighting. Tractor trains sometimes were away from base camp for several weeks and tractors were operated at peak performance for long hours each day.

It was agreed by many persons connected with the operations that Caterpillar Model D-8 tractor is an excellent prime mover under Arctic conditions. Equipped with La-Plante Choate hydraulic bulldozers, D-8's in the Alaskan tractor trains were winterized with special two-man cabs. Engine covers, winches, and hydraulic systems were insulated. Coolant heaters were designed to warm engines by heating and circulating Prestone solution through engine blocks and through coils placed in crankcase oil pans. Heat was forced into cabs by engine fans through openings in engine compartments.

Tracks did not carry grouzers for work on ice and snow. In one case where grouzers were welded on the tracks of an M-4, the tractor was able to haul sleds with 23-ton loads at 10 and 12 miles per hour. Previously, that machine failed to tow a truck over bare ice.

The M-4 had its torque converter feature which

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Tractor-hauled wanigans (used for sleeping and cooking accommodations) cross some rough terrain. Note radio antenna and connecting telephone lines.

was a definite advantage, particularly when pulling sleds on ice, because it enabled the tractor to start off easily in high gear while towing a load.

M-29-C Cargo Carriers (Weasels) performed most efficiently as reconnaissance vehicles. With proper care and careful driving they went everywhere but straight up. They averaged 5 miles per hour in the winter without damage, but higher speeds over snowdrifts were discouraged. Weasels performed work no other available piece of equipment could.

Lubricants

The choice of proper lubricants contributes greatly to the success or failure of equipment operated under Arctic conditions. It is a misconception that very light lubricants should be used in cold weather. Actually, engine temperatures are nearly the same, regardless of atmospheric temperature—they are kept so by thermostats in the cooling systems. A cold engine cannot be cranked at low temperature if the crankcase contains an oil suitable for more normal operating temperatures. The usual tendency is for an operator to use oil light enough to permit cold cranking, with the result that it is too thin after the engine warms up.

It was the practice of men making the Arctic hauls to use the lightest weight oil that would provide adequate lubrication at operating temperatures.

The following lubricants have been recommended for future work under the extreme conditions found in arctic operations:

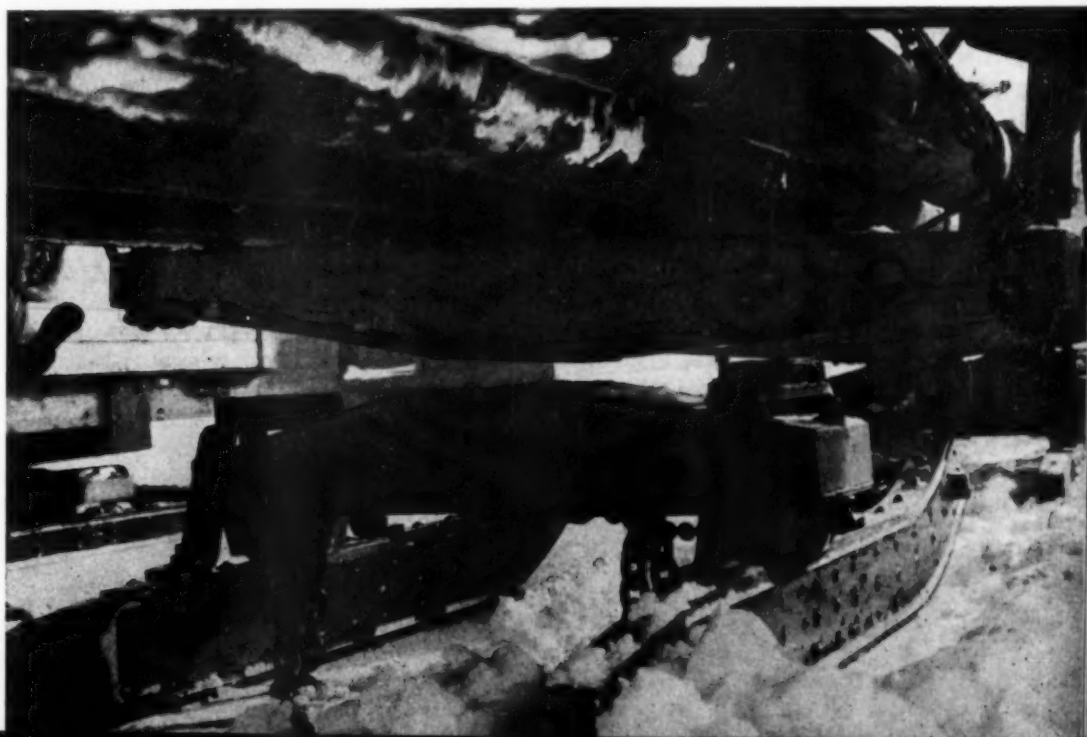
Grade	For use in
SAE 10	Tractor starting engines, Weasels, small engines exposed to low temperatures and used intermittently.
SAE 20	Equipment powered by gasoline engines with copper-lead bearings.
SAE 30	Light plants, pumps, battery chargers with gasoline engines used indoors.
SAE 20 Delo	Diesel engines.
SAE 90 transmission lubricant.	Tractor transmissions, final drives, rollers and chassis fittings at low temperatures.
00 all-purpose chassis lubricant.	Chassis fittings at moderate temperatures.
Standard oil medium track roller lubricant.	Tractor rollers at moderate temperatures.

The success of the 1946 operations demonstrated the feasibility of tractor freighting under Arctic conditions. Equipment used was the best

procurable and stood up well. Operating methods and organization were probably the most efficient devised up to that time, and resulted in a low operating cost. In fact, it has been recommended that future winter freighting operations be organized along similar lines.

Arctic operations should be kept as simple as feasible. At one time it was proposed to establish intermediate stations 1 day's travel apart along a route. Under this plan, tractors would be kept moving continuously; but drivers would work only between two stations, Pony Express fashion. Theoretically, this may appear to be the most efficient method of moving a sled train, but weather conditions being what they are, there is no way of telling when a storm might swoop down and tie up a train at a station for a few days.

Heavy-duty bobsled being loaded with pipe. These sleds carry up to 30 tons of freight. One Caterpillar hauls four of these loaded sleds under ordinary conditions.



RADIO TELEPHONE FOR INDUSTRIAL USE



Radio-equipped G.E. Diesel locomotive reports in at the transmitting station. Radio-telephone communication has definitely speeded production at the Pullman Standard plant.



Engineer calls the dispatcher's office for orders. Motorola FM radiotelephone equipment is seen at left.

PIONEERING in the field of industrial radiotelephone, the Pullman-Standard Company last October installed six Motorola mobile FM radiotelephone units in Diesel switch engines and steam cranes at the Haskell and Barker Michigan City freight car plant. Under the first industrial FCC authorization, the switch engines operate within the confines of the plant's 80-acre tract on 22 miles of criss-crossed track. Central Station Transmitter-Receiver unit for the system is controlled from a sound-proofed Dispatch room in the scale house.

Within a short time the value of the radio equipment was clearly evident. Supply Department foremen are enabled, by means of radio-telephone, to transmit orders to the Diesel switchers and cranes at work in the yards, saving valuable time and preventing duplication

of effort. Truck frames can be moved into the shop, cars put on special tracks for delivery, lumber hauled to production lines—all without the necessity of stopping each operation to allow the engineer in charge to walk to the closest telephone to receive new orders. These jobs are routine tasks speeded up by radiotelephone.

At the head of plant production is A. A. Logmann, manager of works. He says, "In the past we have tried to pre-determine where and when this equipment would be needed and used when making work schedules, but often unforeseen circumstances made the schedule impractical. When emergencies arose, it took the yardmaster an hour or more to locate an engine or crane and get it where it was needed, wasting many man hours on the production lines. With radio equipment, the yardmaster

can keep track of every locomotive and crane and direct it in a matter of seconds."

Because the radiotelephone equipment now in use at Pullman-Standard is frequency-modulated, static-free reception is assured. Working on the new 152-162 mc. wave band assigned by the Federal Communications Commission, the equipment is also free of "dead" spots due to skipping, since the high frequency ground waves give a solid ground wave coverage within the operating area of the plant.

The Diesel locomotive installations have been provided with a generator connected directly to the engine, which operates a standard battery system, supplying power for the radio. The Link Belt and Brown Hoist steam cranes have a six volt generator supplying the power.

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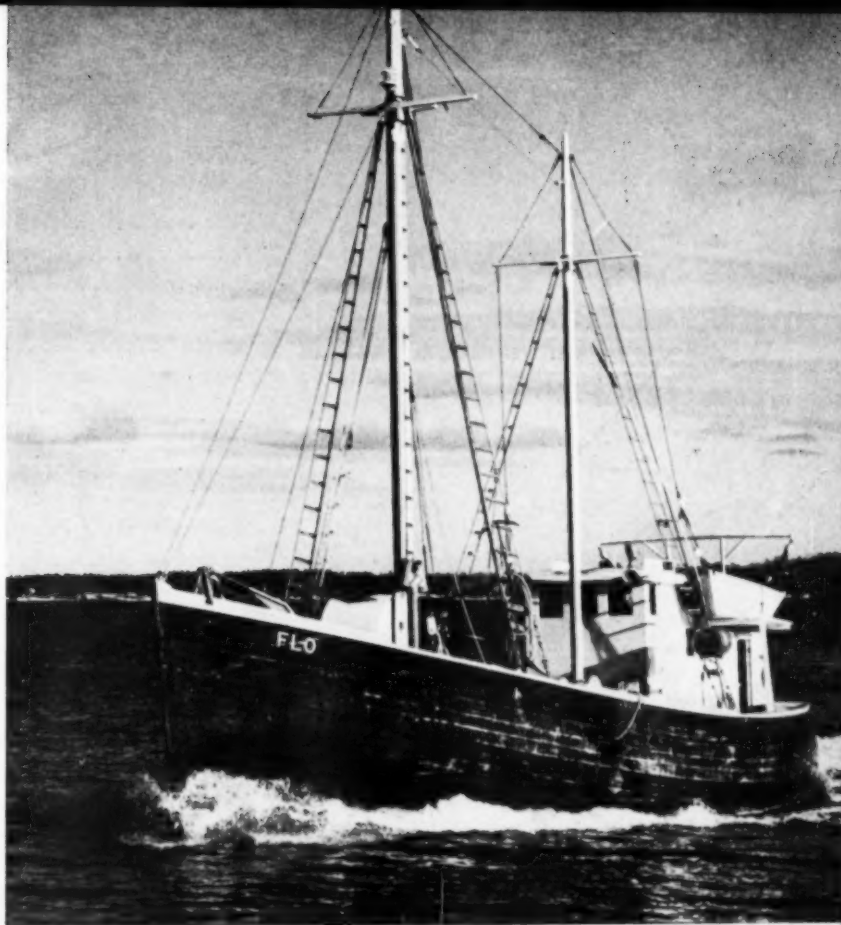
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DOWN EAST FISHERMEN ARE DOWNRIGHT SMART

By BRUCE C. SISSON



Trawler "Flo" underway off Rockland, Maine. She is powered with a Hendy Diesel for 10½ knot speed.

NORTH of Boston the rocky coastline sweeps eastward into the gray Atlantic and you find yourself "down east" in Maine, a land where bigness stops and the individual maintains his generations-old integrity in his attitude towards all things. Along this coast stretching from Kittery to Eastport, Maine, lives that hardy race—the Maine fishermen. Operating out of a hundred-odd ports and harbors which, by the way, include some of the finest harbors in the world, are thousands of boats of various sizes and descriptions engaged in a rough struggle with the stormy Atlantic, winter and summer, to earn a living for their owners, who are generally their skippers. The boats range in size from 18 to well over 100 feet, but the sense of individuality is strong whether a fisherman operates a fishing dory or a 100 ft. beam trawler.

A recent trip along the Maine coast which included visits with fishermen themselves, as well as the boat builders, showed clearly the picture in Maine today. We were invited by the J. H. Westerbeke Corporation of Boston to go "down east" and see for ourselves what was going on.

Driving from Boston on a cold but sunny afternoon we took U. S. Route 1 to Newburyport,

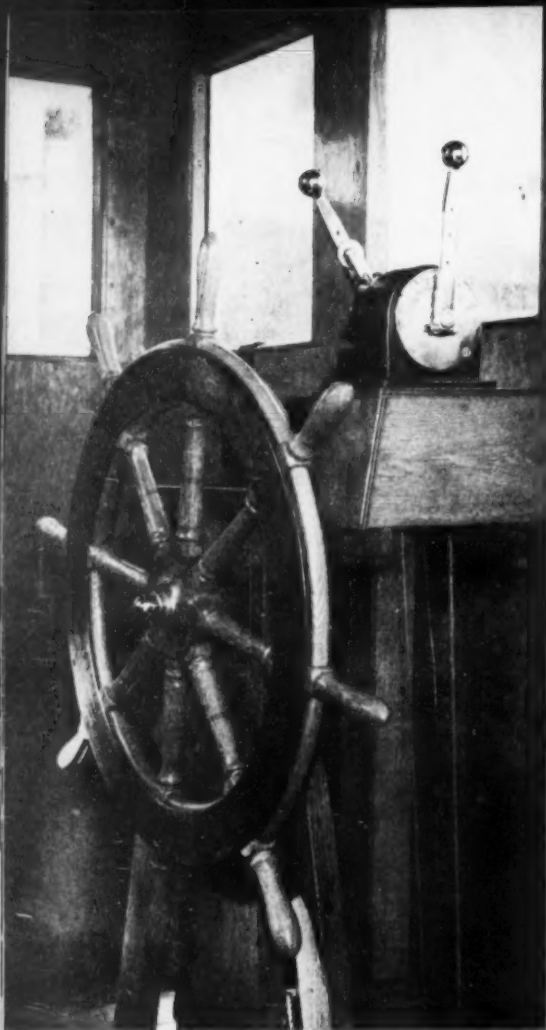
by-passing the famous fishing ports of Gloucester and Marblehead, famous for their fierce rivalry in the days of the fishing schooner. Newburyport, now practically quiescent as far as marine activity is concerned, was once a thriving whaling town and lies at the Massachusetts border on the Merrimac River. Then into New Hampshire on the way to Portland, Maine. We passed through Portsmouth, where the Navy ships looked quiet behind their long shadows at the Navy yard. Before we realized it we were in Maine, running the coastline, dipping inland around deep-bellied harbors and bridging tidal estuaries on our way through Kennebunk Port, Ogunquit and Biddeford. Once in Portland we turned down east, (you go "up to Portland" and "down east to the rest of Maine"). Now we were "down easters," "State of Mainers" or what you will. On past the Naval Anchorage at Casco Bay, through Bath, where 20 new Diesel trawlers are now under construction at the Bath Iron Works yards, ending the day's journey at Thomaston at the Knox Hotel where we stayed the night.

Rockland, Maine

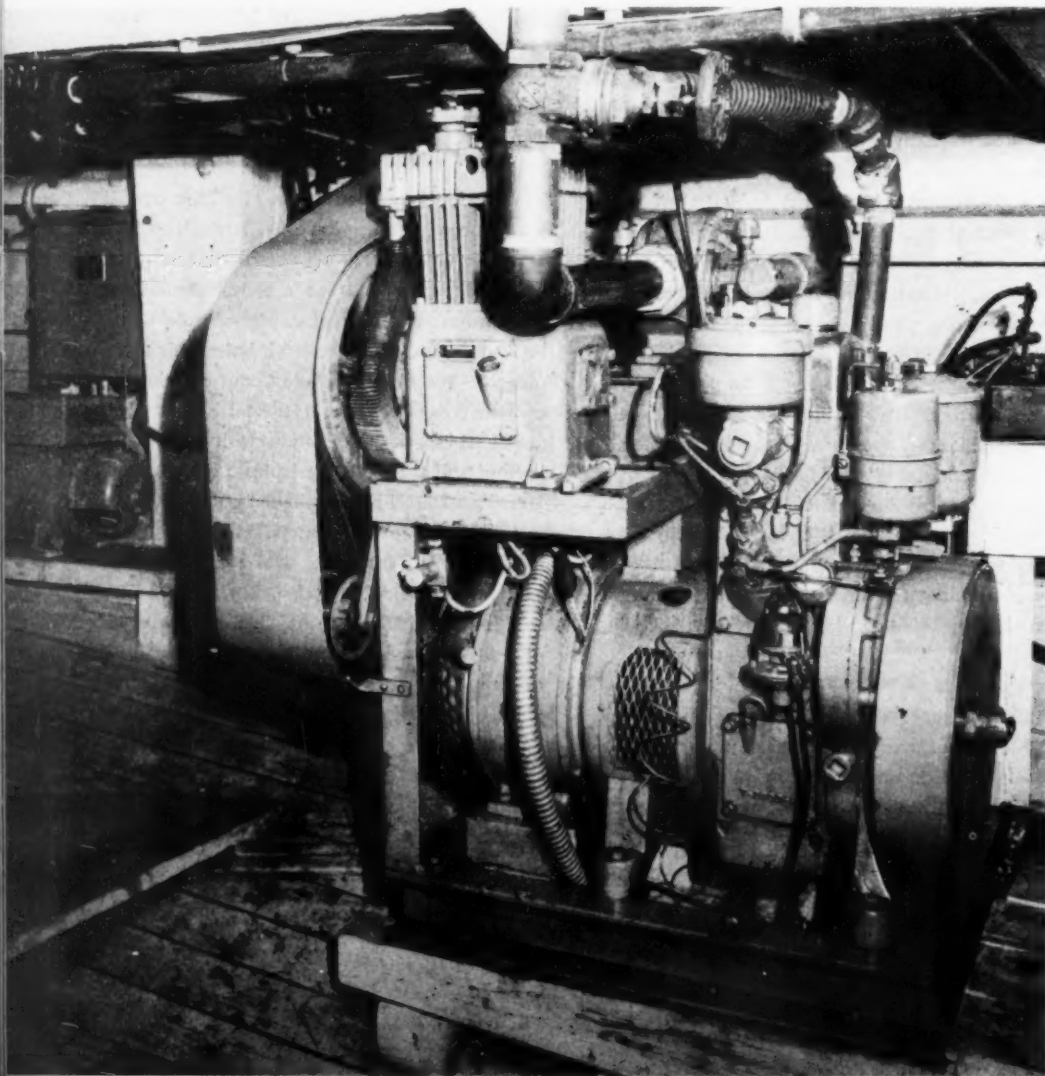
Our first move the next morning was a trip to Rockland, one of the larger towns along the coast which has a population of around 9,000. A beautiful harbor, well protected by a shelter-

ing coast and a breakwater, makes it an ideal fishing boat anchorage. Our business at the moment was a visit to a new 75 ft. trawler, the *Flo*, which was moored at the fish wharf. Skipper Walter Ross, co-owner of the *Flo*, welcomed us aboard and proceeded to show us around the new vessel which he owns jointly with Captain Charles B. Carver.

The *Flo* is a square-sterned trawler 75 ft. overall with a beam of 18 ft. and a 9½ ft. draft (light). With her fish hold full she settles to a 10½ ft. draft. She was built at the Rockland Boat Shop, which is owned by Axel and Sulo Gronros, father and son, who have built their share of hulls. We consulted Sulo Gronros about the construction of the *Flo*. Her keel is native oak and was laid in "T"-section with a 10 x 12 keelson and a 12 x 10 keel plus a 3 x 10 shoe. Her frames are bent, laminated oak, 3¾ x 4⅞ inches placed at 1 ft. centers. Her planking is hard pine 1⅞ in. thick. Her stem is 8 inch oak; her transom 2½ inch oak planking. Her working deck is cedar and her deckhouse is plywood finished. According to Sulo Gronros, the square or destroyer type stern of the *Flo* gives better speed characteristics to the hull. He showed us the beautifully made model of the hull from which the *Flo* was built. The secret of the hull design lies in this smooth



(Above) Wheelhouse of "Flo" showing Sperry Products controls. (Below) U. S. Motors auxiliary Diesel generating set—3½ hp.—which drives generator, compressor, and circulating pump. This generator charges 32-volt Exide battery system.



carved model built by Axel Gronros himself.

The machinery installation aboard the *Flo* is interesting to consider. The engine room extends from just forward of the pilot house to the stern with a headroom of about 6 feet. The engine is located directly under the pilot house, as is the tradition with east coast fishing boats. It is an eight-cylinder, four cycle direct-reversing Hendy Diesel developing 265 hp. at 900 rpm. which delivers power to a 50 x 34 inch Columbian Bronze propeller through a 2:1 Hendy reduction gear. Several interesting features mark the installation. A Twin Disc clutch mounted on the forward power take-off of the main engine controls the Hathaway trawl winch mounted on the main deck directly above. This clutch, which is rated at 60 hp. capacity at engine speed is controllable from the winchman's position on the main deck. This power take-off feature eliminates the necessity for additional auxiliary power for deck machinery entirely. Auxiliary power for ship's service load is supplied by two sources: a 1½ kw. DC Leece-Neville generator driven by the main engine and a 2 kw. auxiliary Diesel generator supplied by the U. S. Motors Corp. which includes a 3½ hp., 1200 rpm. single cylinder Atlas driving a generator. The current from these two sources

keeps the Exide 32 volt storage battery system well charged. In addition to supplying electrical power, the Diesel auxiliary drives an auxiliary Quincy 3½ x 2 x 2½ air compressor and a bilge and circulating pump by a belt drive arrangement. The regular starting and reversing air is supplied by another Quincy compressor mounted forward on the main engine and driven by an accessory drive.

Pilot house control of the engine is accomplished by a Sperry Products Exactor Control, which occupies a minimum of space. A Pierce governor is installed. While we were aboard, Captain Ross took us on a short run for us to see just how the *Flo* behaved. To demonstrate her speedy maneuvering ability, Captain Ross put her full ahead with the Hendy running at its 900 rpm. rated speed. After a few minutes he eased the throttle and put the controls in reverse. From our position in the engine room we could see the Weston tachometer needle drop from 900 rpm. to the zero mark, then the controller actuated the reversing mechanism, the camshaft of the Diesel was air pressured into the reverse position, the high pressure air turned the engine over with a hiss and the ensuing rumble swiftly increased to full reverse power at 900 rpm.—all this—from full ahead to full astern—in 8 seconds with no seeming overload.

The *Flo's* engine room is very spacious compared to vessels of her type. The engine itself stands only four feet above the engine room deck. On the forward bulkhead is located the fuel filtering system which consists of a stand pipe feeding to a Fram fuel filter. Fuel tanks carry 2800 gallons of Diesel fuel.

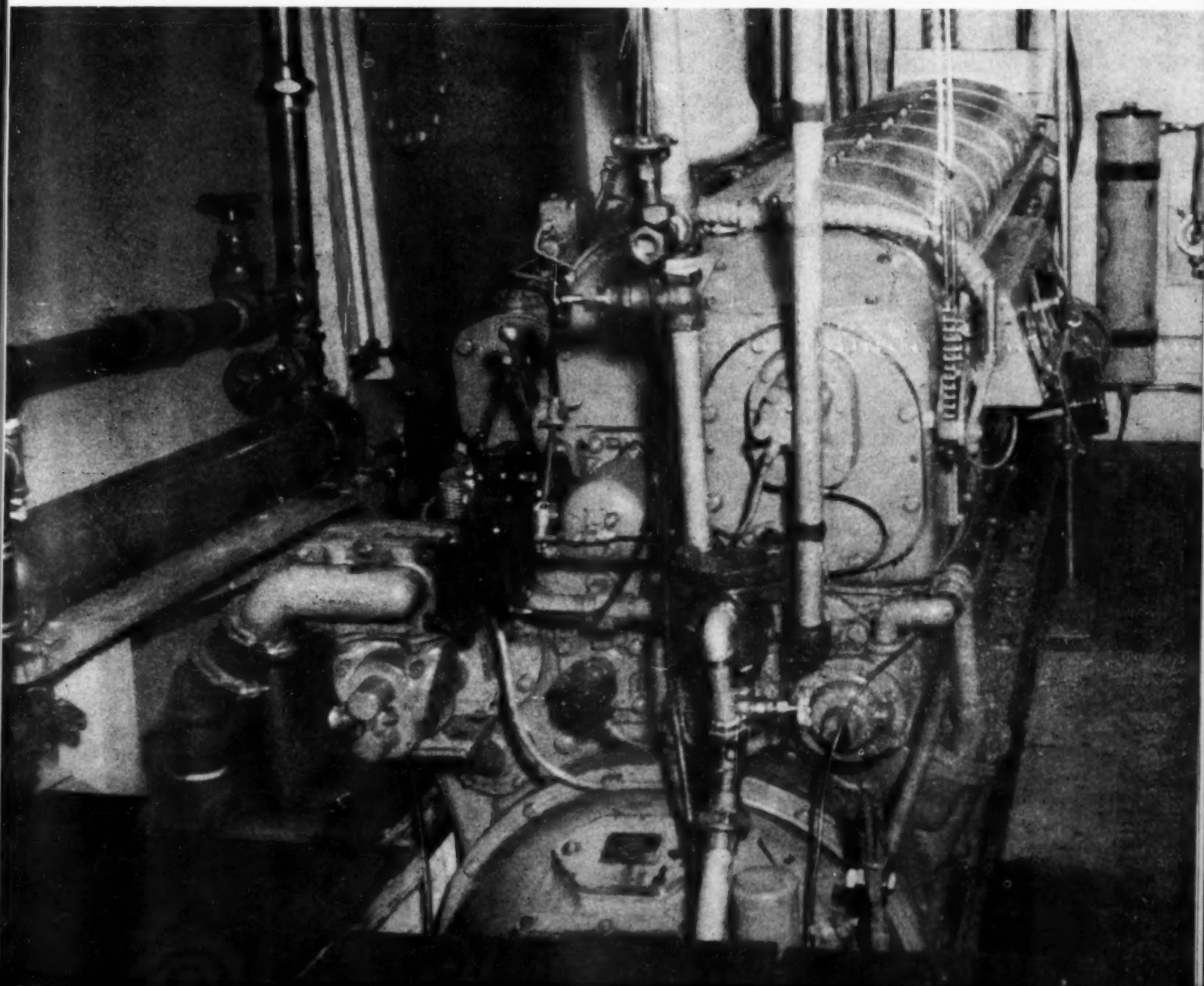
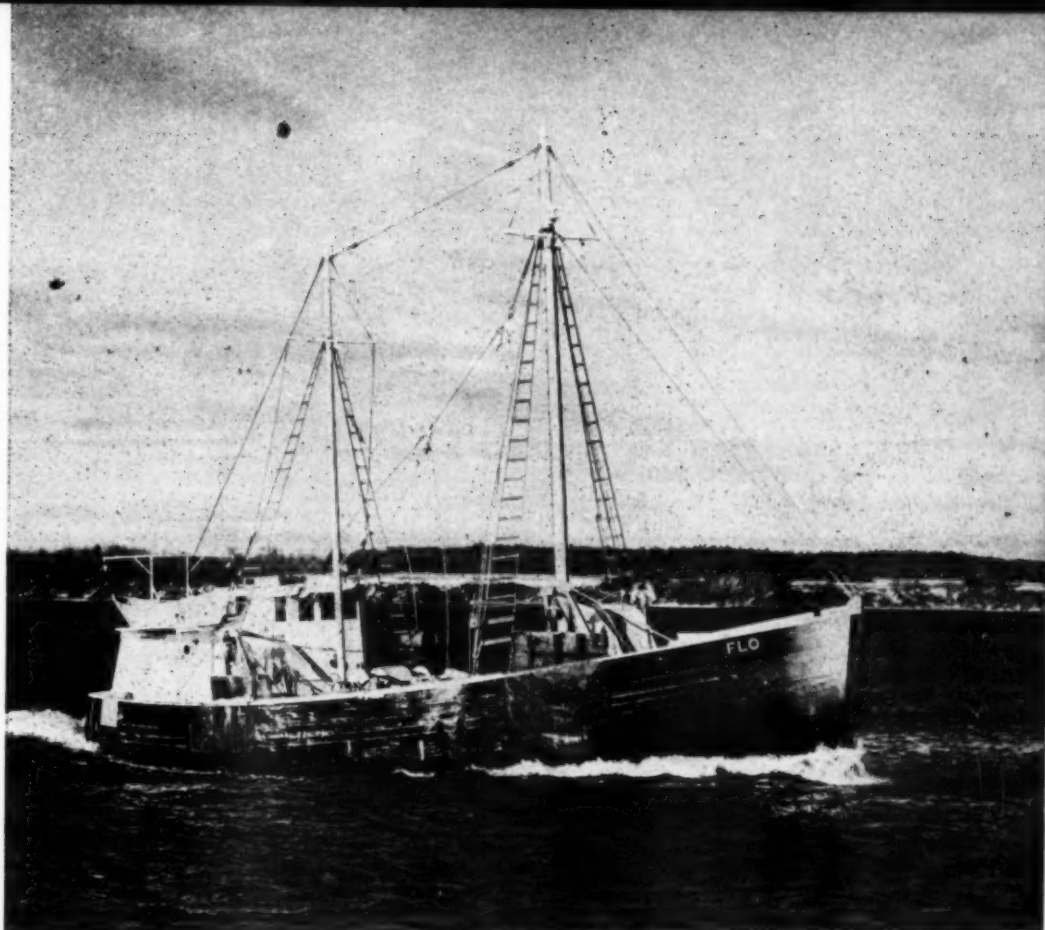
The lubricating oil system carries 150 gallons and is protected by a Purolator edge type filter on the scavenging line to the cooler and by a Winslow lube oil filter of the by-pass type.

The engine is equipped with Bendix-Scintilla injection equipment. A Maxim silencer is installed. The instrument board, mounted on the starboard side of the engine is complete with Jas. P. Marsh gauges, an Alnor pyrometer and a Weston tachometer. The machinery was installed by the Hunter Machine Company of Rockland. Roy Hunter is owner of the company.

After a visit of several hours with Captain Walter Ross, we went ashore and watched him get under way for a trip to the fishing grounds to try his luck at keeping his "high liner" reputation, which is a good one.

Despite the drop in fish prices from wartime peaks, Maine fishermen are investing in new boats to meet the competitive conditions which now exist in east coast markets. A fast boat and a ship to shore radio telephone are now essential for good business. Where prices are highest, there the fish are delivered. Approximately 40 boats 40 feet and over operate out of Rockland, selling their catch to the two packing companies located there. The yearly catch runs slightly behind that of Gloucester and Marblehead, Mass. When you think it all over you can say that the "Downeast" fishermen are a quiet race of men but they're downright smart.

(Right) Another view of "Flo"—new 75 ft. trawler out of Rockland, Maine. She is owned by Captain Walter Ross and Captain Charles Carver. (Below) Engine room of "Flo" showing 8 cyl., direct-reversing, 265 hp. Hendy Diesel. Auxiliary equipment includes Therm-Xchanger coolers (left); Penn Safety Switch (mounted on exhaust manifold); Dollinger air filters; Sperry Products control; Fram fuel oil filter (forward bulkhead); Alnor pyrometer, Weston tachometer, Jas. P. Marsh gauges (gauge board); and Tuthill lube pumps (engine—lower right).





Decked-out in holiday bunting Detroit Diesel opens its doors for the 10th annual Open House. Over 6300 visitors attended.

THE 10th anniversary Open House was held recently by the Detroit Diesel Engine Division of General Motors. After some weeks of preparation, the doors were thrown open from 12 to 6 p.m. on Saturday, February 22nd for an extended tour of Detroit Diesel's office and plant facilities. All employees of Detroit Diesel received a personal invitation from W. T. Crowe, General Manager. Because of the large number of visitors, 6,300 to be exact, no attempt was made to provide a guided tour. A route which wound through the plant, covering all of the departments including the Engine Research Laboratory and Power House, had been carefully planned and was marked by 150 large arrows and by guiding ropes so that plant workers and visitors had no difficulty finding the way through the two mile trip in an orderly fashion.

One of the first displays on the Open House route was the large, complete and spotless hospital where a doctor, his assistant and five nurses are in attendance. Here, visitors were amazed at the completeness of the equipment provided including X-ray apparatus, emergency

oxygen, emergency blood plasma and ward facilities for fifteen patients.

Among other features of the exhibit was a large enclosure between the two main buildings of the plant in which representative pieces of machinery which utilize the General Motors Series 71 Diesel engine were exhibited. This exhibit included a Euclid 15 cu. yd. dirt hauling vehicle, a General Motors 44-passenger city type bus, two large General Motors truck tractors, a Bay City $\frac{3}{4}$ yd. shovel, three Allis-Chalmers tractors, an Allis-Chalmers road grader, and a Diesel-engined Lincoln welding set. This area, which measured 75 x 290 feet, was brilliantly lit by forty-eight flood lights, the power for which was furnished by a 2-cylinder General Motors Diesel-driven electric generator.

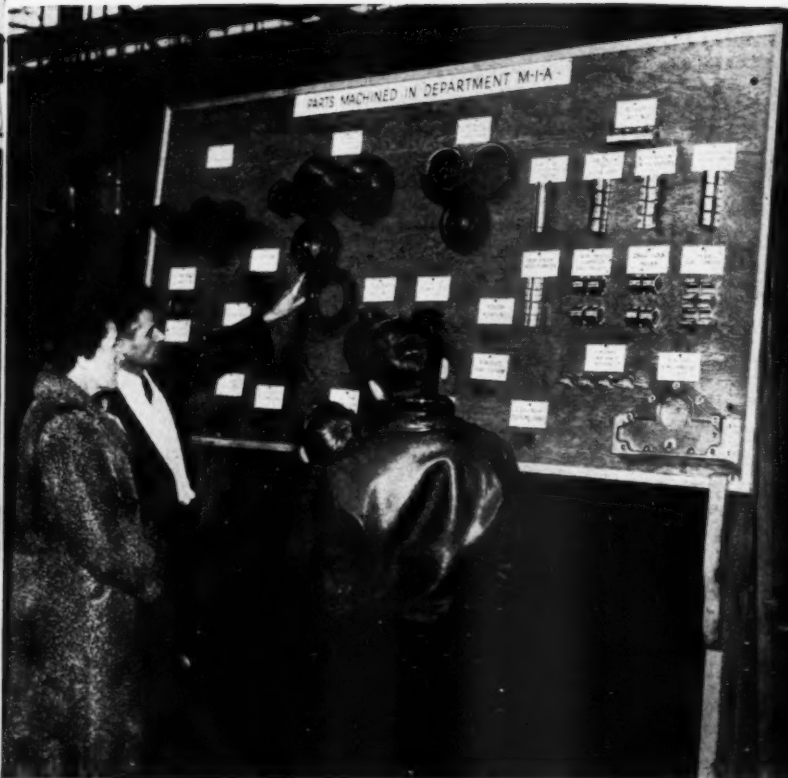
From this area, visitors to the plant were taken through the inspection and metallurgical offices and shops where many of the latest devices and inspection processes including the use of black light and the stroboscope were exhibited. From this point, the route led through the various

manufacturing areas by way of the modern basic assembly line into Detroit Diesel's Research Laboratory.

In the Research Laboratory are located the boiler room which is capable of converting 12,000 gallons of water into steam every hour and the auxiliary power generators motivated by large 2-cycle GM Diesel engines which are capable of furnishing 60% of the power needed to operate the plant. In the Research Building there are also various sound proof rooms in which new designs for the engine are continually being tested and in which break-down tests upon parts constructed of new materials are conducted.

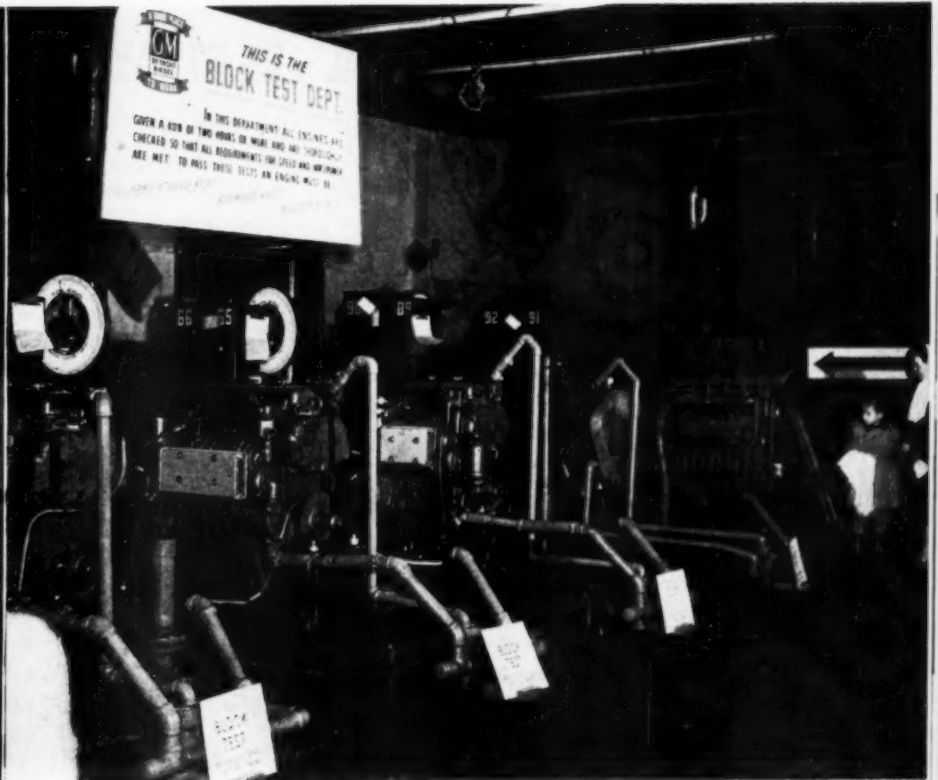
After passing through the Power House and Research Laboratory, visitors to the plant were conducted through the basic engine test room where all General Motors Series 71 engines receive a minimum of a two hour run-in test.

In explanation of this activity, several engines were given a block test during the course of the Open House.



Detroit machinist explains operation of timing gears for series 71 Diesel while wife and sons take an active interest.

IT DIESEL HOLDS OPEN HOUSE

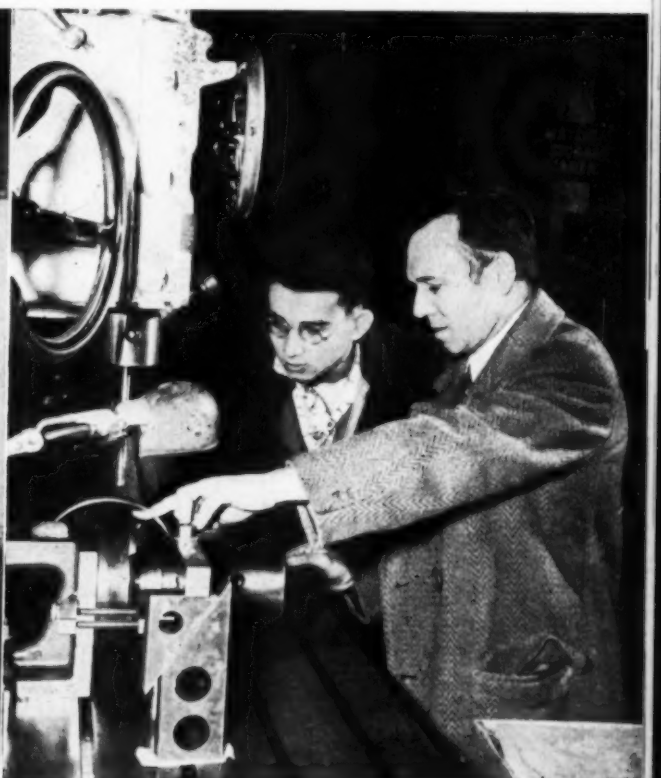
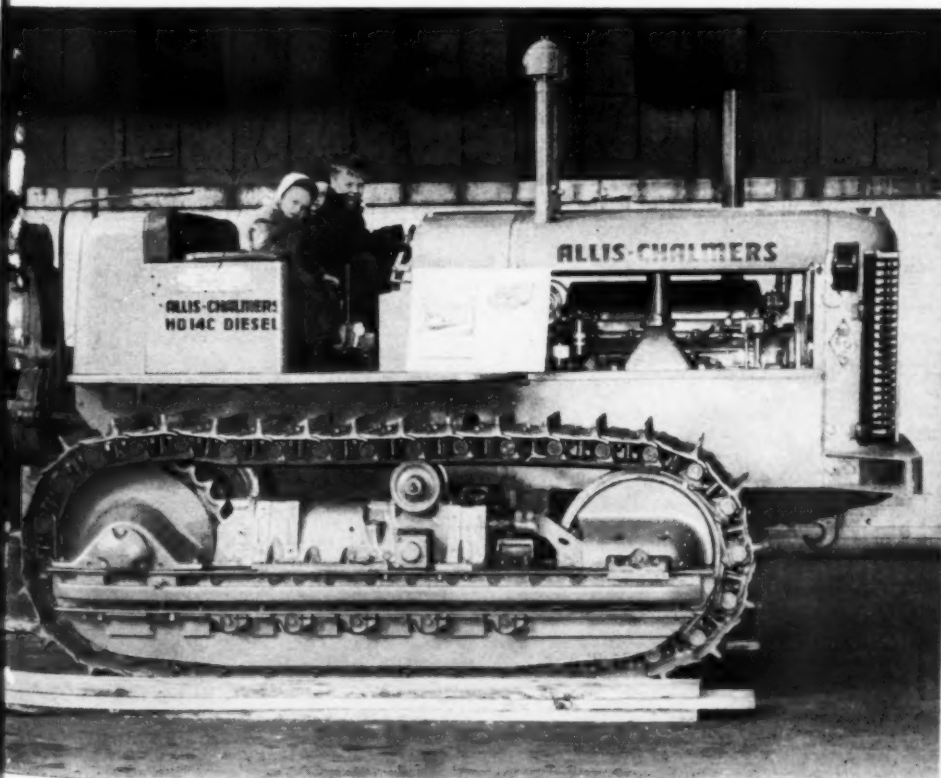


3-cylinder Diesel undergoes the scrutiny of two visitors. Supervisors and foremen acted as guides during the Open House.

Block test department was open to visitors who saw these Diesels tested during their stay. All Detroit Diesels have a minimum of 2 hours on the test stand.

The exhibits included this big Allis-Chalmers Diesel tractor seen below with its three would-be operators.

Set-up man explains the mechanism of a machine tool to a prospective apprentice.



NEW ORLEANS MARINE CONFERENCE A HUGE SUCCESS

WELL over two hundred and fifty officials representing all phases of the marine industry in the Gulf Coast region turned out for the second of a series of D.E.M.A.-sponsored marine conferences held in New Orleans, March 20th. The well-planned program moved off precisely on schedule and afforded all present an insight into the mutual problems of the marine brotherhood and the Diesel engine builders. A new highlight, injected into this conference wherein six Diesel engine users told why they use Diesels and why they like them, was enthusiastically received.

E. J. Schwanhauser, Vice President by Worthington Pump & Machinery Corporation, opened the conference by reviewing briefly why it had been called. Speaking for his fellow manufacturers, he said they were getting to know and understand much better the boat owner's power problems through the contacts made at the marine conferences conducted by Diesel Engine Manufacturers Association, of which he is President. He added that the American-made Diesel engine of today is the best in the world.

R. P. Nolan, President of Algiers Public Service Co., New Orleans, was one of the six Diesel engine users introduced by Mr. Schwanhauser. Mr. Nolan said that 15 years ago he began looking for a type of power for his ferry vessels to replace steam. Specifically, he said, he sought an engine that would lower his fuel costs, provide more deck room, increase his speed while

at the same time reducing his engine room space, give him considerable latitude in maneuverability, and be available on short notice.

The Diesel, Mr. Nolan said, accomplished all these things for him. He added some constructive criticism as to how manufacturers could improve their service on parts, and appealed for more standardization and simplification on parts.

Another speaker who had definite things to ask of the manufacturers was H. B. Dyer, President of the Nashville Bridge Co., Nashville, Tenn.

"We would like to have," he said, "any selection of rated horsepower between 600 and 1,600, but capable of intermittent overloads of 25 per cent, up to four-hour periods.

"We would like the propeller speed between 300 and 400 r.p.m.—the lower speed for the higher horsepower.

"We would like control, in one single lever, adaptable to pilot house mounting and made as near as possible to look like and work like a ship's telegraph.

"Maintenance should be confined to one annual inspection.

"Fuel consumption—less than .35 pound per horsepower hour."

G. O. Huet, Chief Engineer of Higgins, Inc., New Orleans, said, "The reason we use Diesel engines is that we can't find anything to take their place."

During the war, Mr. Huet stated, Higgins built more than 22,000 landing boats, of which 18,000 were Diesel-powered. Higgins also built 100 large ships, in which Diesels were installed.

"It was an accelerated program," Mr. Huet said, "to the point at one time where we turned out one ship per day for 16 days. That meant if anything went wrong with the engines at all, our program would be disturbed. However, it didn't happen. . . .

"I don't know what more anybody could expect of any piece of mechanism, and I don't know of any other mechanism that would give better results. . . ."

In colorful language, A. M. Hyer, President of Hyer Towing Co., Pensacola, Fla., summed up the case for Diesel engines as he saw it. The Diesel, he said, was the only thing that he, as an intracoastal operator, could use to compete with other means of transportation, such as motor trucks and freight trains.

"Most of the reasons are obvious," said Capt. Hyer. "One reason is economy in operations. It takes much less crew hire. You don't have to keep steam up all the time. The thing is

Speakers' table at the New Orleans Marine Conference dinner—left to right: Harvey T. Hill, Executive Director, Diesel Engine Mfrs. Assn.; R. M. Pearson, Sales Manager, National Supply Co.; A. M. Hyer, President, Hyer Towing Company; R. W. Bayerlein, Manager Heavy Machinery Division, Nordberg Mfg. Co.; G. L. Breece, Chief Engineer, McWilliams Dredging Co.; R. H. Morse, Jr., Vice President, Fairbanks, Morse Co.; and G. O. Huet, Chief Engineer, Higgins, Inc.



callable at a moment's notice. Go down there and crack the air to her and she's ready to go.

"You get a maximum of power in a minimum space, and naturally, on intracoastal waters, where your depth of water is limited, we have to have a certain sized hull; can't use any kind of hull we want.

"... We wouldn't be in business if it wasn't for the Diesel engine, and I think every towboat operator on the intracoastal will agree with me in that respect."

G. L. Breece, Chief Engineer of McWilliams Dredging Co., New Orleans, described the rigorous demands made on a Diesel engine attached to a dredge pump. "You might say it leads a miserable life in there," said Mr. Breece. "But we have found it gives a very satisfactory account of itself in the service we put it to."

George Brink, of the Moran Towing Co., New Orleans, related how, several years ago, his company faced a serious business problem. The radius of its operations increased suddenly from "a few hundred miles to a few thousand."

The company owned about 30 steam tugs which could carry up to five days' supply of fuel.

"We couldn't find fuel docks enough along the coast to keep us moving," Mr. Brink said. "The result was, we had to go to Diesel." After the engine users had had their inning,

the manufacturers again took over. Robert H. Morse, Jr., Vice President and General Sales Manager of Fairbanks, Morse & Co., spoke on "How do American-Made Diesel Engines Compare with the Pre-War Product?" Present-day engines are better, Mr. Morse said, because of (1) competition between manufacturers, and (2) cooperation between manufacturers and maritime interests in providing the best possible type of propulsion in ships carrying American-made products to South American markets, to enable them to cope successfully with foreign shippers.

Specifically, improvements in modern Diesel engines have come about through greater use of precision-type bearings, better combustion and scavenging, more rapid heat dissipation, improved design of oil-cooled pistons, better fuel injection systems, advancements in cooling systems, improved methods for filtering and handling fuel and lubricating oils, and better systems for air intake and exhaust, Mr. Morse said.

"Where Can Ship Operators Turn for Authentic Performance and Maintenance Figures for Ocean-going Vessels?" was the topic assigned Roland W. Bayerlein, Manager of the Heavy Machinery Division for Nordberg Manufacturing Co.

The ship operators' best source of authentic data is the ship operators themselves, Mr. Bayerlein said, because "there is no central source

or official record of performance and maintenance figures kept anywhere, to my knowledge." Mr. Bayerlein pointed out that in the stationary Diesel engine field the American Society of Mechanical Engineers had done the type of job in collecting operating data from utilities and industrial plants that was needed for ocean-going vessel owners. He emphasized that all information "must be weighed carefully in the light of present-day design and construction," for information based on design and construction of 20 years ago "is not indicative of what the modern Diesel can accomplish."

A question-and-answer period was the last event on the afternoon's program. Charles M. Reagle, Vice President of Cooper-Bessemer Corporation, received the questions from the floor, and was aided in his answers by a panel composed of Mr. Schwanhauser, Mr. Bayerlein and V. O. Harkness, Manager of Diesel Sales for Fairbanks, Morse & Co.

A notable feature of the "Q & A" session was that every question was met head-on, with no ducking or side-stepping of even the tough ones. Mr. Reagle was brisk but thorough in either answering the query himself or assigning it to one of his panel.

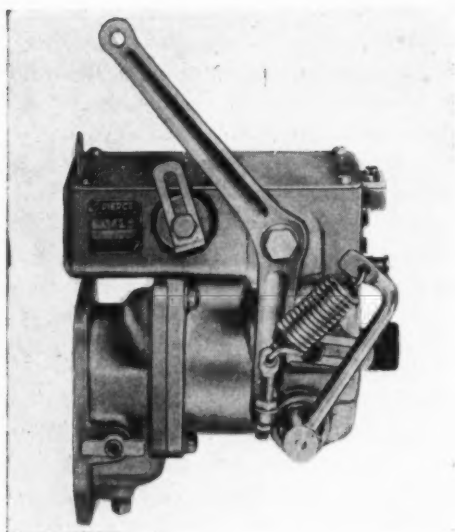
The overall feeling about the New Orleans conference is that it may be surpassed by the one to be held next fall in the East, but if such be the case, the eastern meeting will have a high level at which to shoot.

(Left) E. J. Schwanhauser, Vice President, Worthington Pump and Machinery Corp., Presiding.

Speakers' table continued—left to right: H. B. Dyer, President, Nashville Bridge Co., Nashville, Tenn.; R. E. Friend, President, Nordberg Manufacturing Co.; R. P. Nolan, President, Algiers Public Service Co.; C. M. Reagle, Vice President, Cooper-Bessemer Corp.; G. Brink, Moran Towing Company, New Orleans; and A. F. Vars, President, Sterling Engine Company.



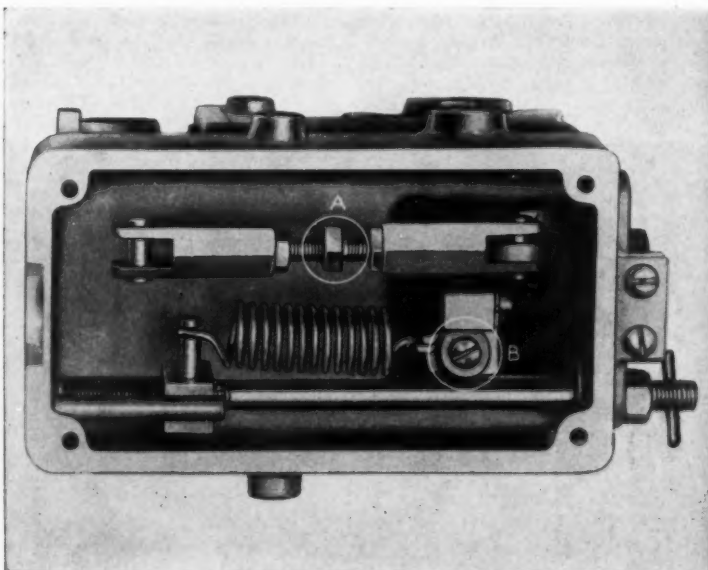
NEW PUMP-MOUNTED DIESEL GOVERNOR



New Pierce governor built in constant and variable speed models is fuel pump mounted.

PIERCE Governor engineers have developed a new pump mounted Diesel engine governor which incorporates precision and versatility. This governor is designed to be mounted on Bosch A and B and Demco and other multiple unit fuel pumps. Mounting may be quickly accomplished without disassembling the governor and without removing any working part of the fuel pump. The governor is driven directly from the fuel pump cam shaft through a neoprene bonded gear designed to absorb torsional shock. Provision has been made for a standard tachometer drive on the governor which operates at engine speed. All adjusting mechanism is easily accessible for setting or servicing the governor.

With lid removed adjustments are easy. Rack shaft linkage is adjusted (A) without uncoupling the linkage from the rack shaft. Self-locking regulation screw (B) for micrometer control.



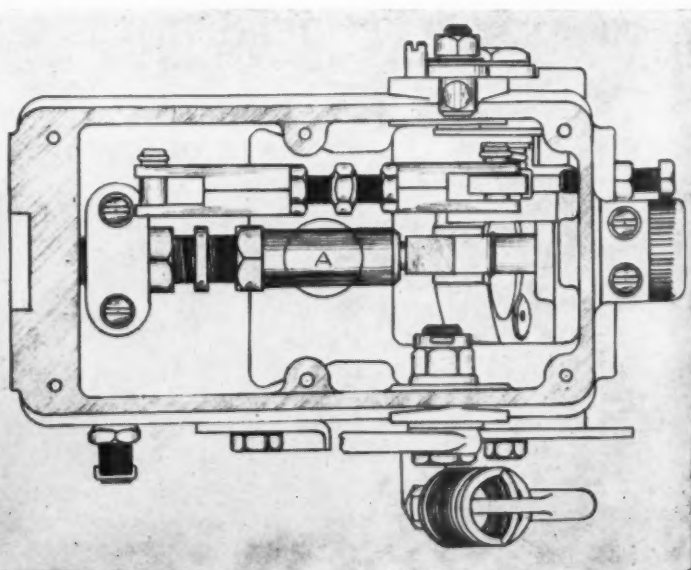
Both constant and variable speed models have been developed to meet the demands of various engine usages. The constant speed model is capable of giving the extremely close regulation required for generator and other similar constant speed used. The variable speed governor is a full range type of governor. By this we mean that it is capable of giving the same regulation through a range of a three to one ratio in engine speed. To explain this further, let us assume that we have an application which demands speed variation from 500 to 1500 rpm. and 5% regulation is desirable. With the new Pierce Diesel governor adjusted for 5% regulation it will hold very closely to this regulation at 500, and 1500 and all speeds between these two figures. It is further possible to obtain very close regulation through this range or to broaden the regulation to a point more suitable for automotive and marine applications. Another factor of interest to variable speed governor users is that comparatively little force is required to move the speed change lever through the full range of speeds for which the governor is adjusted or to hold the speed change lever

at any given point in this range. This is particularly useful in eliminating excessive foot pressure of the accelerator control.

In automotive applications, it is desirable to increase the lugging power of the engine to prevent stalling on long pulls. A torque control device may be incorporated into this governor, at the request of the user, which will take advantage of the available torque in the engine and increase its lugging ability. The unit is designed to adjust the pump position when the engine speed decreases from the top full load speed to the speed at which the torque peak is desired.

A starting device may be incorporated in the variable speed type of governor to facilitate starting when cranking at slow speeds and particularly at temperatures below 30°F. This unit is designed to increase the maximum pump position when cranking. As the engine picks up the governor will take control of the engine even though the operator may hold the starting device open.

Designed for automotive applications is (A), torque control which permits rack shaft to open beyond normal full fuel position when engine speed falls below a predetermined point.



DIESELS BEAT THE WEATHER

By F. HAL HIGGINS

MARK TWAIN gets the credit for saying that everybody talks about the weather but nobody ever does anything about it. Mark should come back and have a look at the Sacramento Valley he crossed by boat and stage when he was here in the Gold Rush days and see what the boys are now doing about the weather. While the orange growers farther south are smudging the tourist's view in beating John Frost, up in the Sacramento Valley the rice growers have given their fall harvest season a telescoping to get their crops out of the fields by October instead of allowing the work to drag into December, and even January, when the rains come early and heavy enough to bog down the field work. That happened in the fall of 1945.

The Heidrick boys—Joe, Fred and Doc—are getters of the third generation in grain and rice farming. Their father, Andrew, can recall his boyhood as a neighbor of the fabulous Dr. Hugh Glenn for whom Glenn County is named. Glenn farmed a little block of 66,000 acres along the Sacramento River bank, finally raising his goal of a million bushels of wheat in the 1880 crop. But Glenn used the biggest threshing machines and headers and an army of 600 men working 800 horses and mules to harvest that million bushels of wheat to beat the hazards of floods, droughts, wild geese and 18%

money. He did it with a sagging post-war wheat market that kept sliding down to put the pressure on the wheat grower to grow it cheaper or go broke. Wheat dropped to \$1 a hundred-weight on the San Francisco market that fall of 1880 and the farmer was behind the economic 8-ball where he always finds himself after every post-war bulge in farm prices as the world gets back to production.

The Heidricks, father and sons, had been using combines since the father saw the first one appear on Glenn's ranch in 1883. Those combines were all horse-drawn, and it had taken one-quarter of the Glenn crop to feed horses and men. This change from thresher and header to combine cut a lot of the men and animals off the payroll and feed bill. Joe Heidrick, mechanical genius of the Heidrick family, can and does design and build anything the ranch needs in the Heidrick shops. With Diesel tractors, Caterpillar, International and Allis-Chalmers, the latter with General Motors engines on the place, he knows the efficiency of Diesels for cost cutting.

Figures of 1946 Diesels vs. Old Machines

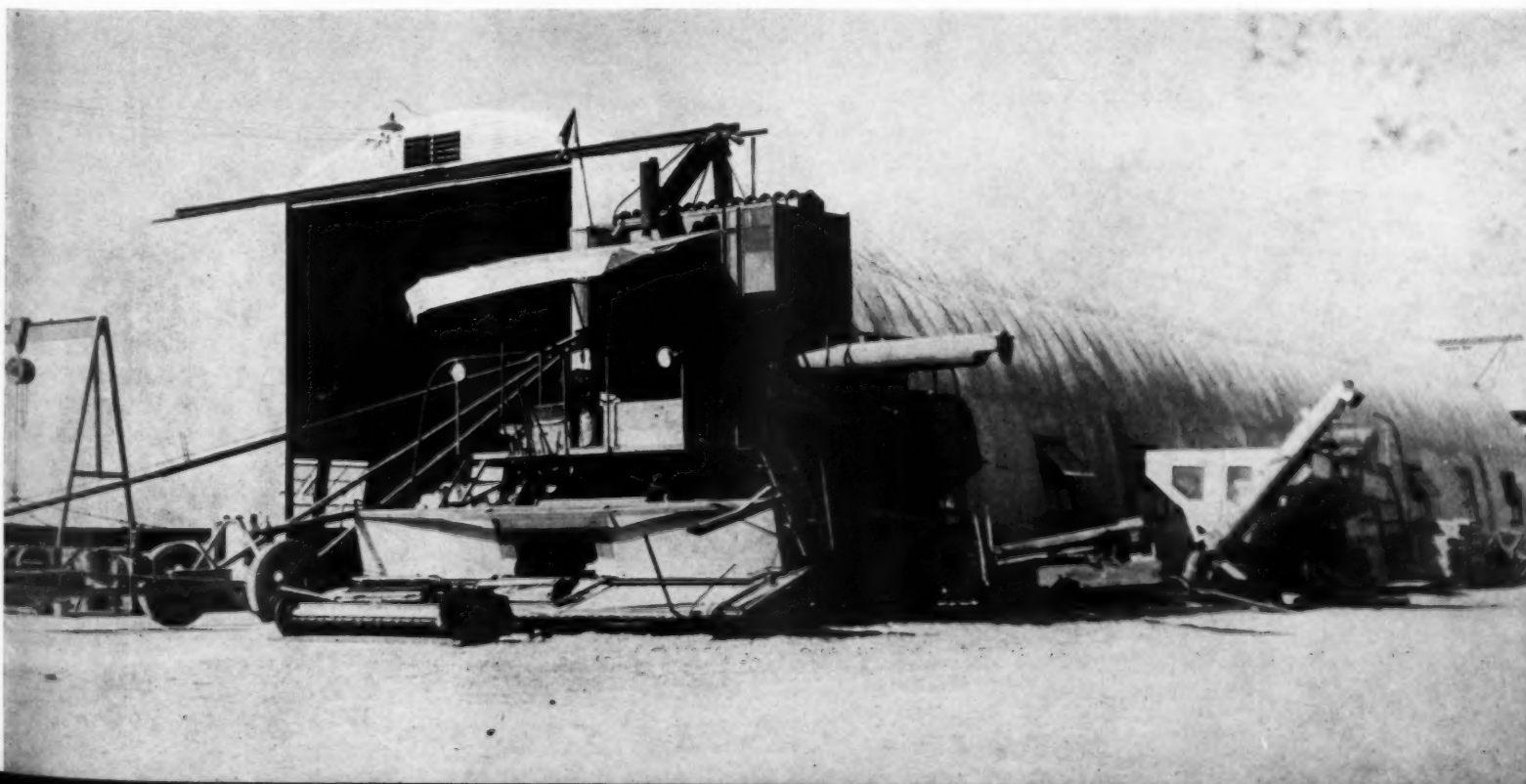
The writer asked Fred Heidrick at the end of the 1946 season what his fleet of Diesel one-man combined harvesters meant to him on that

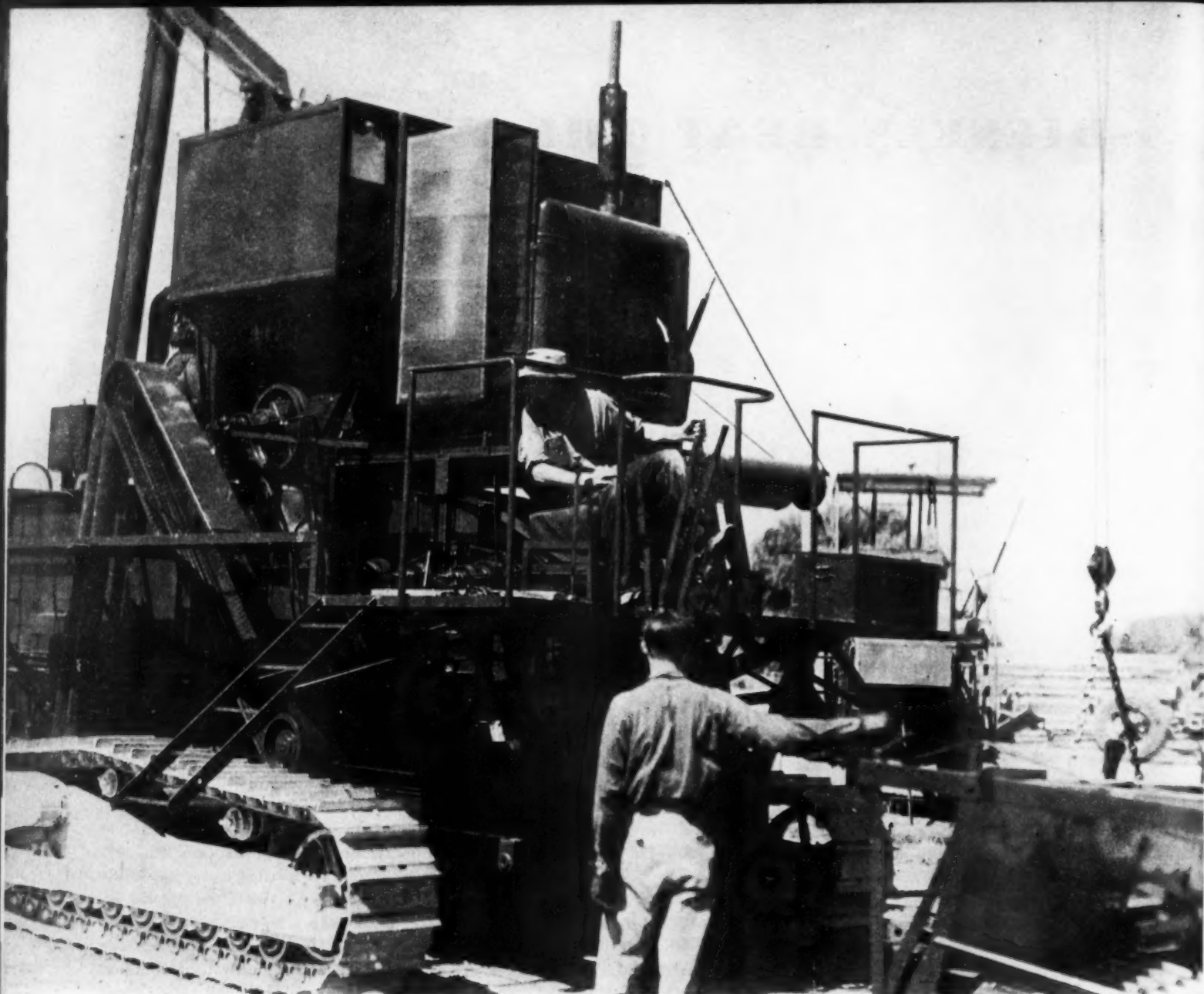
1946 crop compared with the older machines. Fred paused and ran his mental calculator over his figures for a minute to come up with this summary:

"Going back to that wet 1945 rice crop when the Sacramento Valley grower lost over 10% of his crop, with some up to 15% and more, we got all of ours harvested because we had our first Diesel outfit ready. We would have lost half the crop in 1945 if we hadn't had this machine. We had out 5,000 acres of rice that season. This past season of 1946 we again had out 5,000 acres of rice, but shortened our harvest season to 30 days as a result of having a fleet of three of these Diesel outfits. We used no 'pulls' this past season, leaving them in the lot as obsolete when the one-man machines are on the job, especially with our fleet of three Diesel machines. Normally, with good weather we had a harvest season of 60 days.

"So much for time saved and the hazard of weather reduced much more than that 50% shown in time, for that last half of the season is the dangerous part when we can and occasionally do get a rainy month or two as happened in 1945. On men on the harvesters, one man does the work formerly done by three. Only one-third the labor is needed. Labor costs are \$12 a day for the Cat skinner (tractor

120 foot Quonset Ranch shop built by the Heidrick brothers to house and service equipment. Diesel engined combine harvester (foreground) is being serviced for rice harvest.





Joe Heidrick at the controls of Kaiser-built Diesel combine. Note General Motors Diesel mounted in back of operator's stand. Many rice farmers are building their own one-man combines on the Heidrick model.

driver), \$18 for the combine man, \$12 for the header man; total \$32 a day for a pull combine. On these one-man Diesel combines, the one man gets \$20 a day. He's a better man and with the whole job to do, all the responsibility of keeping that outfit going efficiently is his. He earns his money. The saving on fuel is the less important point, but it adds up, too. These Diesel outfits with the pair of 60 hp. General Motors engines burning 40 gallons a day at 8 cents a gallon cost \$3.20. The pull outfits have Diesel Cats pulling them, but there is a gasoline engine up there on the combine that takes 30 gallons of gasoline at 15 cents a gallon, or \$4.50 per outfit. Add that onto the pull tractor's Diesel fuel and you will find a saving per machine of \$3 or \$4, depending on how heavy going the tractors encounter. You know when you get onto rice fields that are soft, a tractor

with a load on its tail will bog down where a self-propelled machine with no tail drag on the engines will step right over a duck pond, even with the load of 18 to 20 tons of machine. There is plenty of ground contact from the long wide tracks wearing wooden cleats to give the big machines unbelievable float on soft going.

So, with Colusa county losing from 10% to 15% of its rice in 1945, with some growers losing half their crops, the Heidrick Ranch headquarters became the "Rice College" for growers after the 1945 season. Every rice grower in California came over to take a look and ask permission to take measurements, borrow plans, or find some one who could build one like it. The Heidricks generously permitted their neighbors to do this, as most of the big rice

growers know each other and their problems and do neighborly acts even as did their pioneer grandfathers. So, Tom Sills and his brother and their sons built four, changing slightly to suit their own ideas based on years of rice growing on lands on the other side of the Sacramento Valley. Sills introduced one new idea that caused comment. This was the use of hollow steel instead of wood overshoes, or cleats, bolted to the tracks to give more ground contact. With these added, there was an extra ton of weight, at least, yet they proved O.K. Sills machines also have round fuel tanks instead of square, and the Diesel engines are carried lower to give better balance, he thinks, with his bigger grain tanks.

Kaiser of ship building fame came into the picture and built three machines at his Yard 3

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on the order of one rice grower who knew the Kaiser shop superintendent from college days. Heidrick took one of these Kaiser-built Diesel-engined machines and used it as the third such machine in his 1946 fleet of three. The ranch-built combine all performed with less trouble in ironing out bugs than did the shipyard machines, all agreed.

Earl Wallace, another of the big rice and grain growers, with headquarters only 5 miles from Heidricks, built one Heidrick-type machine and changed over one of his other one-man combines to Diesel from gasoline. He was especially pleased with these jobs turned out from his own ranch shop and plans to build more for 1947. Hahn and Mehrten, a little shop in Stockton run by two ex-GI's with a lot of machine shop know-how, built three Heidrich-type Diesel machines at the orders of some ten rice growers in Crawford's Woodland Rice Mill Co-op at Woodland. The writer went out to see the first of these three machines perform for "Bill" Crawford on a field between Sacramento and Woodland. It moved into the field and went around without a hitch. Crawford came flying over in his private plane to take a look. As the new combine moved around his field he dipped the plane in a salute to its successful start as he flew back to his mill. The second machine Crawford and his group of co-op growers got from the Stockton shop was seen as it was winding up the season in the Sutter Basin, the rich sag in the Sacramento Valley a few miles north of Knights Landing.

All the growers seen that day were enthusiastic. They were finishing their harvest up in half the usual time with every acre harvested and no trouble. Like the Sills brothers, Heidricks and Crawford, they all agreed that here was the final answer to the big problem of beating the weather to a rice harvest. And the machines are just as good in barley harvest in the June-July season, which is the way most of these Sacramento Valley growers operate. That increases the harvest year with two harvest periods and a tune-up period for machines in between grain and rice.

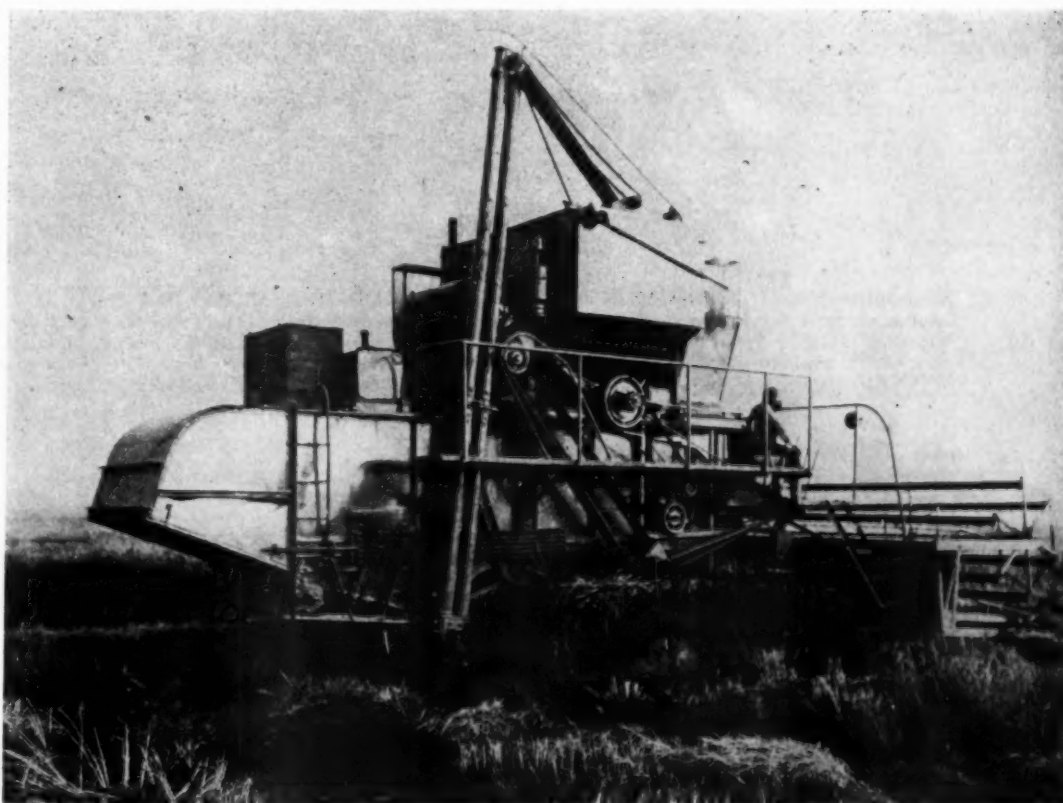
Ranch Shops that Can Build Any Farm Machine Needed

That these big rice and grain men in the Sacramento and San Joaquin valleys are smart machine men who know engines as well as service and machine shops is seen in the new shops they are investing in since war profits made it possible. There is nothing on their ranches in which they take more pride. As one big shop owner in Chico put it to the writer last

spring, "These farmers have always wanted these fine shops with the best lathes, electric power, grinders, presses, welding machines, etc., in them, but they never could afford them till now. So they are building them and installing such equipment with skilled men to work in shops and operate the machines." Your Old Reporter asked two or three of these ranchers with new shops what they had invested in them.

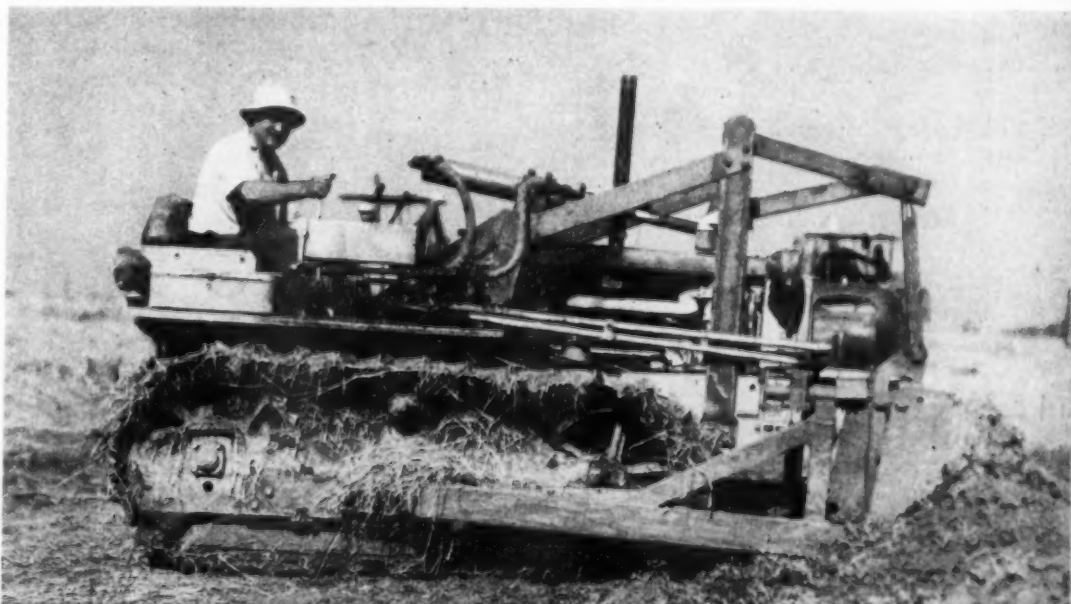
One ran over his costs for me, starting with a \$2460 lathe, and so on through Hobart welders, fluorescent lights, drill stands, electric hand tools, etc., until he stopped at "about \$16,000." Others went to \$15,000, \$12,000, and so on. But to see them at work building combine

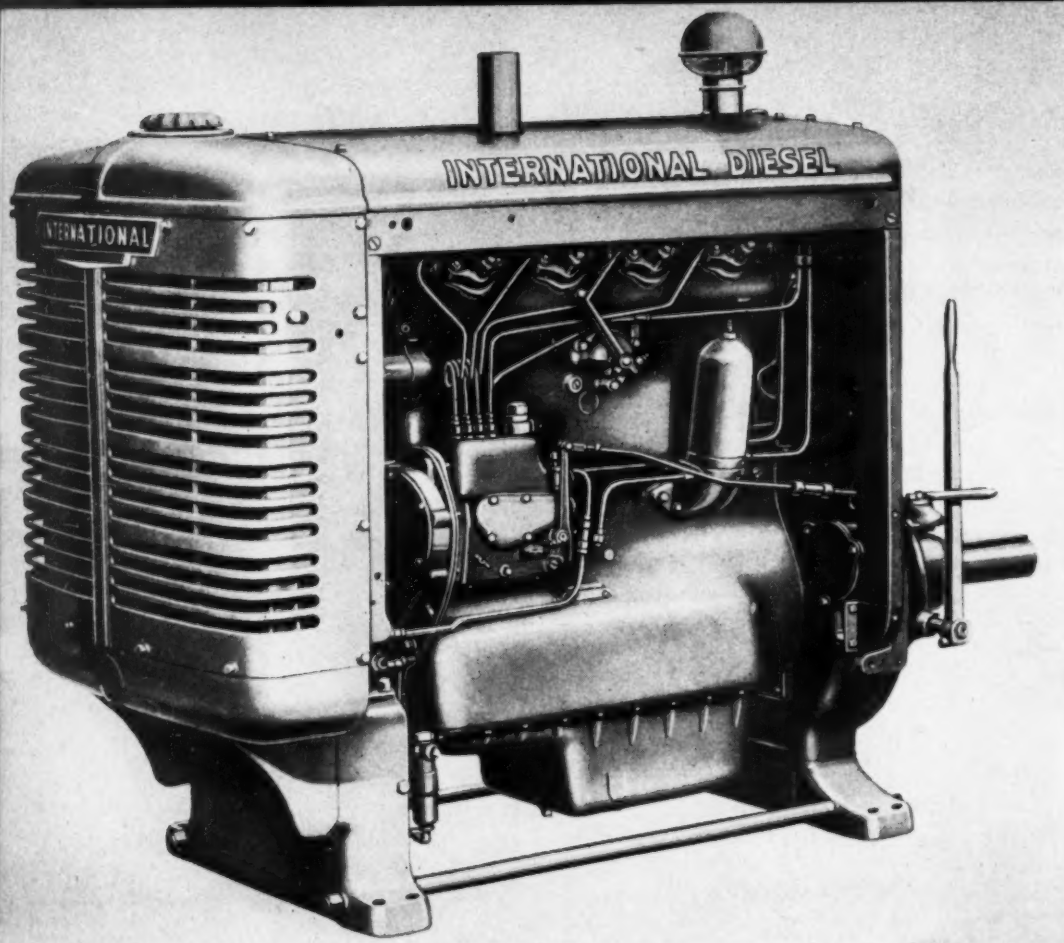
harvesters with from two to eight General Motors Diesel 60 hp. engines setting at one side waiting to go on the machines as they are finished makes you a little bit proud of the breed of men who built this West and are still at it. They restore any lagging faith in the American to stay on top the heap in spite of how things look and sound down in Washington or in the Big Town on the Hudson. These boys aren't a bit afraid to build a machine to beat the weather to the punch and make a profit at it, too! Nor are they afraid of high wages as long as they can equip their skilled labor and team it up to use the tools they hand them to permit them to earn the wages they want.



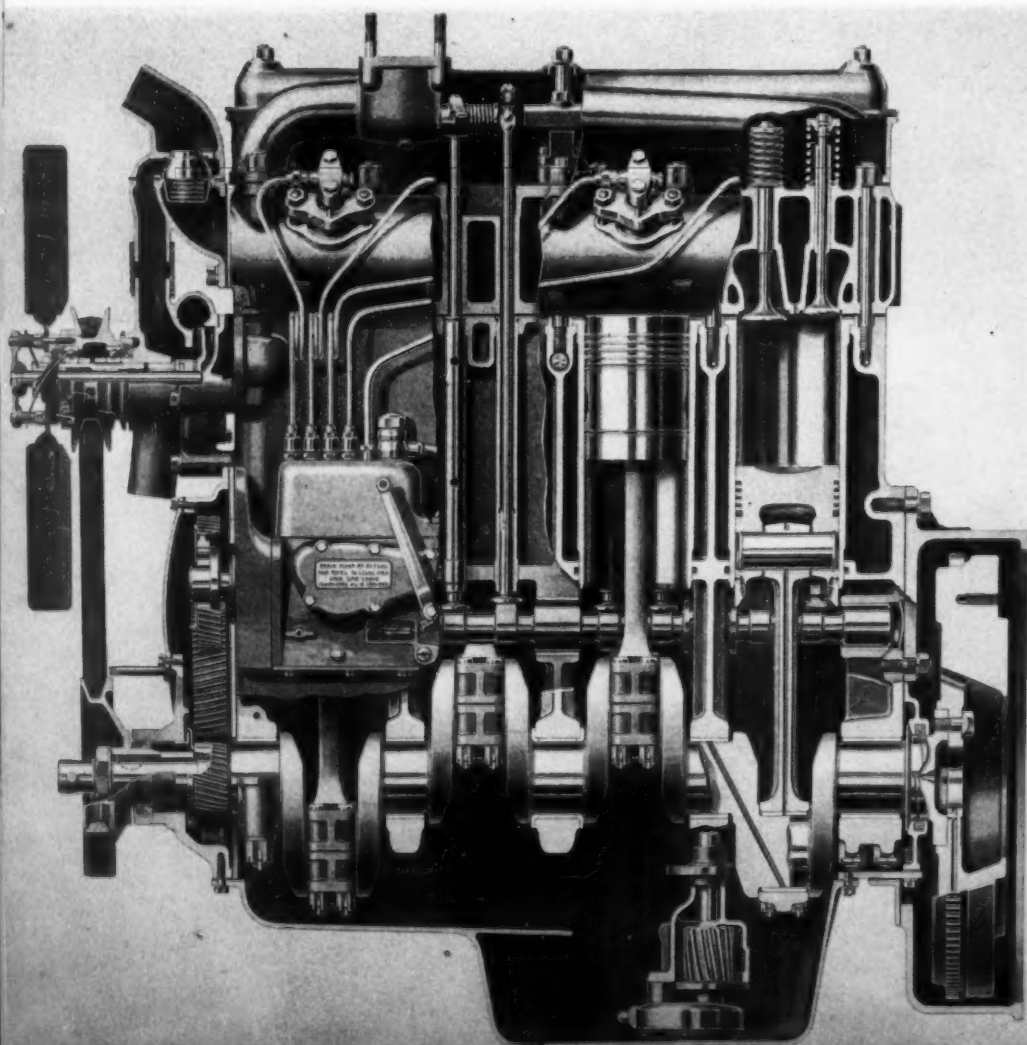
One-man Diesel combine goes to work. These machines cut harvesting time in half and reduce labor costs considerably.

A homemade bulldozer mounted on Caterpillar tractor knocks down checks in rice fields to permit the use of trucks in the fields without the danger of axle-breaking jolts.





New International Harvester Diesel now going into production at Melrose Park works. Unit shown above is 4 cylinder with a $4\frac{3}{4}$ inch bore and $6\frac{1}{2}$ inch stroke. Fully equipped with fan, radiator, clutch and power take-off, it develops 76 maximum hp. at 1600 rpm. The engine is started on gasoline at a compression ratio of $6\frac{1}{2}$:1. Once started a single lever shifts the engine to Diesel operation at a compression ratio of $15\frac{1}{2}$:1. Below is seen cutaway view of engine.



INTERNATIONAL HOPS



View of power show held at the Melrose Park works.

A COMPLETE exhibit of all types of power and equipment for earth-moving and construction was reviewed recently by 400 industrial equipment distributors and others at the Melrose Park headquarters of the International Harvester's industrial power division. The show was unusual in that 32 other manufacturers had machines on display. The show occupied a 40,000 sq. ft. section of the plant. Outstanding among the exhibits was International's new Diesel crawler tractor, the TD-24, which handles easily despite its 35,000 lb. weight. It has eight speeds forward and eight in reverse. New equipment shown by other manufacturers included a high-speed 2-wheel tractor with dirt wagon, and a 4-wheel drive tractor having a crawler type chassis and crawler controls.

On the same day that the power show was held Neal Higgins, manager of sales, industrial power division of the International Harvester Company, addressed the industrial power dealer and distributor organization of the company. Predicting full production for 1947, Mr. Higgins stated: "... it is believed that the production or supply rate can be greater by the end of 1947 than any previous year ... my guess is that the supply of most items in the construction machinery industry will exceed the 'critical' demand some time during 1947."

ark words.

In discussion of machinery and machinery and more than 50 highway lettings uses for development of a power user."

In another general machine Reishus development

"Melrose now considers, who up into with the Chicago area in is no an devoted single r

Speaking Reishus

INTERNATIONAL HARVESTER POWERSHOW



ark words. TD-24 Diesel tractor is seen at left.



Portion of the parts and service display at the recent show. Seen is a portable track pin press and an International field service truck.

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In discussing the future for construction machinery industry, Mr. Higgins said: "High costs and material shortages are holding up more than 500 million dollars worth of national highway improvements and delaying contract lettings for at least as much more. Many new uses for industrial power equipment have been developed during recent years—all of which indicate a continuing sales market for industrial power machines which prove profitable to the user."

In another talk made by H. T. Reishus, general manager, industrial power division, Mr. Reishus described the scope of the company's development in industrial power.

"Melrose Park is just one of three big plants now coming into full production on the crawlers, wheel tractors and power units that make up International Industrial Power. Together with the Milwaukee works and tractor works in Chicago, we now have a total manufacturing area in excess of 4½ million square feet. There is no area in all of American industry this large devoted to this kind of manufacture under a single management."

Speaking of the cooperative effort made, Mr. Reishus went on: "In all sincerity I believe

that the exhibit you have inspected this morning is one of the greatest examples of industrial cooperation in American manufacturing history. Here is a real proof of Yankee ingenuity on a grand scale—24 separate manufacturers so completely integrating their efforts that the result is this mammoth, flexible line of equipment ready to tackle any construction job in the book and do it better at lower cost than it was ever done before."

An interesting announcement was made by W. W. Black, supervisor of the service and parts section of the industrial power division, concerning "inventory management." This program is essentially a control program designed to maintain a 60-day bank of service parts in the parts department of industrial power distributors. Harvester's industrial power division in the field is divided into eight service zones, each with a service engineer. These engineers live in the zone to which they are assigned. These men are specialists on field service and service parts. They direct such distributor activities as adequate parts stocks and sales, base of operations, service personnel training, and product information. Also it is their job to report product performance and keep abreast of service information from manufacturers of allied equipment.



Neal Higgins, manager of sales, industrial power division, International Harvester Co., whose speech highlighted the recent gathering of the industrial power dealer and distributor organization of the company. He called on all members of the group to cooperate to help solve the problems of shortages.

SUPERVISING & OPERATING ENGINEERS' SECTION

Conducted by R. L. GREGORY*

"UNIT INSTALLATION AND ITS EFFECT ON DAILY OPERATING PROBLEMS" Part 2

IN last month's issue the writer began a series of articles devoted to the installation of a modern nine cylinder, 3600 horsepower, two cycle, mechanical injection unit. This discussion will have to do with the actual building of a foundation for such a unit. There are many points involved in such a job, which should be of vital import to both supervisors and operators.

The foundation for such a unit is of great importance. In designing such a foundation, many factors enter into the picture: the subsoil beneath the foundation, weight and speed of the unit which the foundation must support, stresses and strains placed upon the foundation, etc. Taking all these various factors into consideration there is a specific relationship between the weight of the engine and foundation.

On this particular job, the approximate weight of the unit resting upon the foundation was 177 tons. This included the engine proper as assembled, the generator complete, outboard



Figure 1. Base slab with tie rods extending.

bearing, bearing gear, exciter and exciter drive. No auxiliaries were mounted on the foundation proper. The foundation proper, exclusive of the base slab, was constructed of approximately 260 cubic yards of concrete, weighing 2 tons to the cubic yard or a total of 520 tons, approximately three times heavier than the unit.

The subsoil under the base slab consisted mainly of a layer of gravel about three feet deep, underneath which was a thick heavy layer of blue clay, an almost ideal subsoil upon which to construct such a foundation. The first step was to drive a rectangular form of

Carnegie M-115, tongue and groove-steel sheet piling. Each length of piling was eight feet long, and was driven down through the layer of gravel into the blue clay, so that the top of the piling when driven, was six inches below the basement floor elevation. After the piling was driven and in place, the subsoil was excavated to a depth of 2 feet below the floor level, and then the sub-base slab was poured.

This base slab was approximately 18 feet wide by 42 feet in length by 2 feet in thickness, and was thoroughly reinforced by placing 1 inch

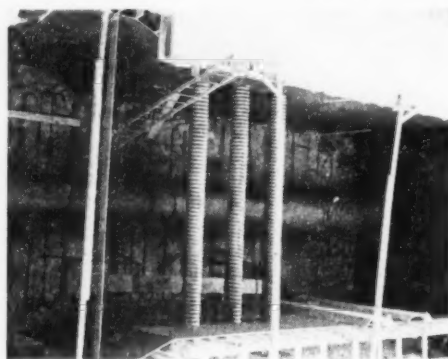


Figure 2. Scavenging air intake piping shown in position. Vertical corrugated piping is for fuel, oil, and water lines.

and 1½ inch reinforcing steel both lengthwise and crosswise through it at regular intervals. The ends of these reinforcing rods were bent so as to interlock over the tops of the sheet piling. Tied to these reinforcing bars were other bars placed in a vertical position as shown in Figure 1. These vertical bars formed the tie between the base slab and the foundation proper.

The base slab was then poured and brought up even with the basement floor, a 1 inch mastic joint was made between the base slab and the basement floor proper, so that there was absolutely no connection between the basement floor and the new base slab. This is an essential point in eliminating the transfer of vibration.

One other point should be mentioned. Before pouring the base slab several pieces of copper bus bar were properly bent and brazed onto the sheet piling for use in grounding the frames

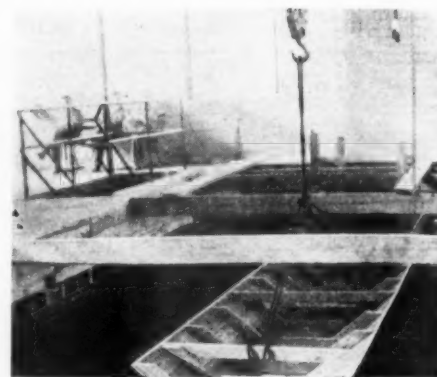


Figure 3. Completed form with reinforcing steel rods in place. Wooden form being lowered into position.

of the generator and exciter and the conduit runs. The base slab was then allowed to set for about three weeks before proceeding further with the foundation construction.

Some difficulty arose on the location of the scavenging air intake piping. The preliminary plan called for this pipe to run directly off the scavenging header and out through the wall of the building to the blower house. However this was not only an unsightly arrangement, but by locating it in this position, use of the crane around the generator would be almost impossible. Space between the units in the basement would be cramped if this air intake pipe were run down from the scavenging header and along the side of the foundation to the blower house. It was finally decided to run it through the foundation as shown in Figure 2. This gave more basement room and also made a neater job.

After this pipe was properly placed in position as shown in Figure 2, it was then braced and welded down to the tie rods. This anchored the pipe firmly in place, so that there was absolutely no side shifting or upward lifting when the concrete was poured. The foundation form was then built upon the base slab, up to the proper height. The foundation proper is 14 feet wide at the farther end, widening out to 16 feet at the generator end, and is approximately 41 feet in length. The height from the basement floor is approximately 12 feet 4 inches

... And now please turn to page 64 ...

* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.



(Isotherm Adsorption Apparatus)

Mystic Maze

Seen through this mystic maze of tubes and wiring is a Sinclair Research technician. What his apparatus means to users of industrial lubricants is no mystery, however.

At Sinclair Laboratories, the Isotherm Adsorption Apparatus is used constantly to determine the effectiveness of adsorbents used in lubricating oil refining procedures. Because Sinclair lubricants are made with infinite care to suit the specific requirements of your equipment, it is highly important to know exactly how adsorbents, catalysts, and other treating materials perform in a refining process.

This intricate apparatus is an assurance that Sinclair lubricant manufacture guarantees the very highest quality product. It is one more evidence of the painstaking Sinclair research and refinery control that result in outstanding lubricant performance.

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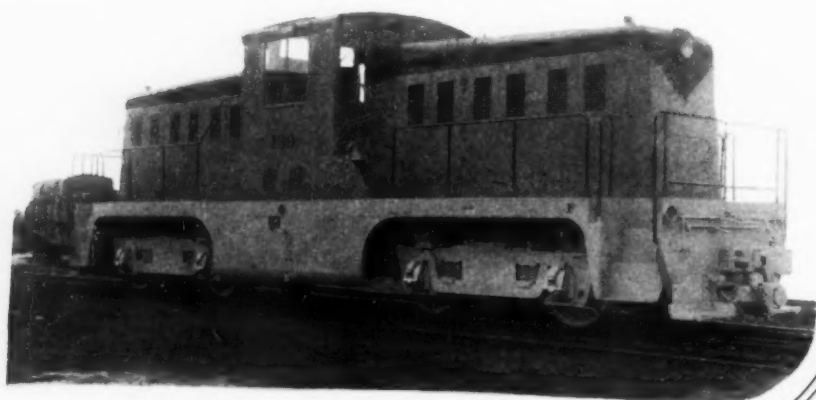
. . . Continued from page 62 . . .

under the engine proper and 14 feet 4 inches at the sole plates in which the generator rests. When the form was completed it was checked and rechecked by the engineers to see that the foundation bolt forms, the crankcase form, the grout pocket forms and jack pocket forms were all in place and correct according to the drawings and specifications. The foundation was

poured in approximately 48 hours, sand, stone and high early cement being used and was allowed to set for approximately three days before the form was removed. In next month's issue the actual work of unloading the unit placing of the bed plate and start of erection will be discussed.

ALCO Graduates Diesel Trainees

FOUR trainees in the Stationary Diesel Engine



SAFER . . . SURER SWITCHING . . .

The complete absence of smoke and steam in switching and hauling operations conducted with Whitcomb Diesel locomotives, is an important safety factor. Ground signals transmitted to the operator are easily and surely received, resulting in safer train movements and less fatigue for the crew.

Accidents due to poor visibility are materially reduced; easier smoother switching and hauling result because the operator's vision is never clouded by dense smoke or steam. He can see where his locomotive is going and what's on the track ahead of him.

The economies that are possible in reduced maintenance and operating costs should be reason enough to replace all your steam locomotives with Whitcomb Diesels. The safety factors including the lowering of accident rate are important additional reasons why Whitcomb Diesel locomotives should be doing all your switching and intra-plant hauling.

Diesel Electric Locomotives from 25 to 95 Tons
Diesel Mechanical Locomotives from 3 to 30 Tons

THE WHITCOMB LOCOMOTIVE CO.

PARK & PROGRESS STS., ROCHELLE, ILL.
SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS



Division of American Locomotive Company who have completed intensive training at the company's plants in Auburn and Schenectady, N. Y., have been assigned to sales offices as specialists for stationary Diesel engine sales, it was announced recently by N. C. Naylor, American Locomotive vice-president.

The four are John B. Whitworth, Jr., transferred to the Atlanta office; George Hoppock, Chicago office; Richard B. Fairman, New York office; and Roger W. Clements, St. Paul office. They also will assist district sales managers in general sales matters.

Woodward Governor Announces Eleventh Prime Mover Control Conference

THE eleventh Prime Mover Control Conference, sponsored by Woodward Governor Company, will be held at its Rockford, Illinois plant, June 16-20. These conferences were inaugurated in 1927, were discontinued during the war and were resumed with the tenth meeting in June 1946.

The conference consists of a series of well-planned meetings devoted to discussion of and instruction on control of all types of prime movers. Those attending the conference are given informal freedom of the Woodward plant—which, by the way, is one of the most modern in the world—where they can see the actual operations on production, assembly and testing of governors.

Woodward Governor Company generously makes its facilities available to and invites all those interested in Prime Mover control problems without cost except personal traveling and living expenses. Attendance at previous conferences has included large groups representative of the power plant and manufacturing fields. If you plan to attend this year's conference, write Norman Nolling, Woodward Governor Company, Rockford, Illinois.

Brothers Hesler Represent E-M

THE three Hesler brothers, natives of Kansas City, Mo., have returned to that city from the Services to form the Hesler Company. Harold P., William W., and Delbert P. Hesler are graduates of the University of Michigan and are registered professional engineers in Missouri. Their office at 950 Dierks Building, Kansas City 6, Missouri, has been commissioned by Electric Machinery Mfg. Company, Minneapolis, Minn., to sell its line of motors, generators, magnetic drives, and controls.

AIR COMPRESSOR LUBRICATION

Solving AIR COMPRESSOR TROUBLES

"A mining company* in the Joplin area was having trouble with the unloading valve on an Angle Compound Air Compressor. They were also troubled with discharge valve breakage of the high pressure cylinder.

"The previous oil was replaced with Cities Service North Star Oil No. 5 and not a single instance of gumming or sticking or trouble of any kind with the unloading valve or discharge valve has been reported in over two years."

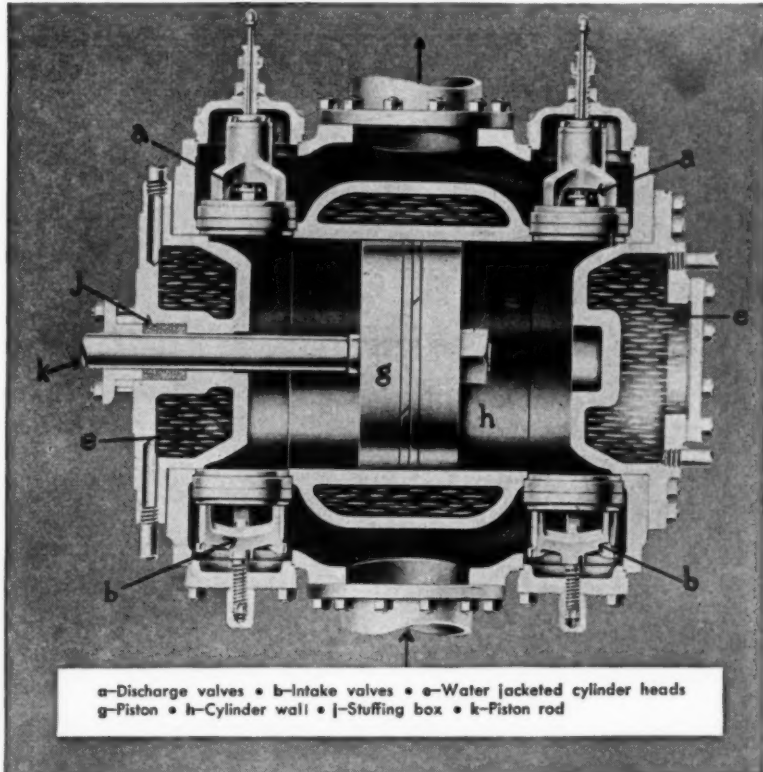
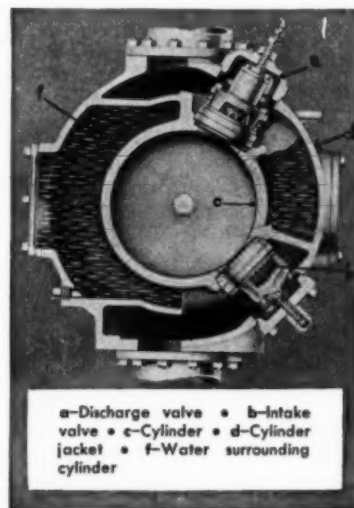
"A utility plant* in Springfield, Mo., uses compressed air from a single stage belt-driven air compressor in connection with overhauling jobs of the boilers in their plant. They are all of the water tube type and are overhauled at regular intervals. During these overhauls they need a constant supply of air. The unloading valve of this compressor would gum up to the extent that they would have to clean it about every other day when using a competitor's oil. I sent them a drum of Cities Service North Star Oil No. 5 about a year ago, and checked with their Chief Engineer last month.

He tells me they haven't had to clean the unloading valve since putting in the North Star Oil."

"We have lubricated a 1000 cubic foot two-stage air compressor in the Mid-Continent area for over three years.

The customer* says that in using Cities Service North Star Oil No. 5 in this compressor he hasn't had any valve breakage and that carbon deposit on valves and seats has been down to practically nothing."

*Names on request.



Solving compressor operating problems has been Cities Service's special forte for years. A phone call or card to the Cities Service office nearest you will bring this engineering experience to your plant. There is no obligation. For useful information that every air compressor owner and operator should know, write for our free booklet, "Air Compressor Lubrication." Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y., Room 73.

Cities Service means Great Service

CITIES

SERVICE

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"MORE THAN JUST A TRADE JOURNAL MAN."

By ROSWELL WARD

We print herewith an unsolicited article which recently came to our office from Roswell Ward, a former associate of Rex Wadman in some of the developments in Diesel journalism which find their expression in DIESEL PROGRESS. This article is part of a book to be entitled "Essays on Trade Journalism." It is possible that many in the Diesel industry will remember Roswell Ward who is now listed in "Who's Who In America" as an author. This surprise package is offered as a fitting tribute to our publisher on his twenty-fifth anniversary as Journalist to the Diesel Industry—The Editorial Staff.

FEW branches of trade journalism developed as rapidly in the period "between the wars" as did our Diesel trade journals. In that development we find a reflection of the very rapid expansion of the Diesel engine industry. However we also find a situation which I think is unusual in trade journalism, in that we have such a close relationship between the development of Diesel journalism and the development of the Diesel industry that we might say that the developments have been mutually complementary.

A new industry can be greatly influenced by the trade journals which grow up to serve it. A trade journal can just "live off" a new industry by using it as an excuse to solicit advertising. Or a trade journal can take the bitter with the sweet, it can get so closely involved in a new industry that it reflects its problems and its hazards as well as its promise and its opportunities and it "lives for" the industry that it serves.

Trade journals are curiously reflections of the men who run them. Take away the men and you have nothing left. It is like a successful play. Take away the actors and you have just a stage setting. Hence any history of trade journalism has to be written in terms of personalities. This is particularly true in the history of Diesel journalism. Possibly I can illustrate this point by a conversation which took place in Rochester in 1926.

A Chapter In The History of Diesel Journalism

Rex W. Wadman, Editor and Publisher of DIESEL PROGRESS



was talking with the late Harry C. Goodwin who ran an advertising agency which served a manufacturer by whom I was employed. As I came into Goodwin's office a man was ushered out.

"Who was that?" I asked.

"A trade journal man," said Harry. "No, come to think of it, he is more than just a trade journal man. He runs a Diesel engine magazine, but damn it, he did not talk about his magazine at all, he talked about Diesel engines. Do you know, I never knew what the hell a Diesel engine was until he came along."

The trade journal man who impressed the not usually impressionable Harry Goodwin as "something more than just a trade journal man" was Rex Wadman. Not long afterwards I came again to Harry Goodwin, this time with a letter from Rex Wadman asking me to become an Associate Editor of his magazine. Goodwin read the letter and said, "You better go down there—that guy has got something you seldom see in trade publishing."

As I review my notes on Diesel journalism I come again to the name of Rex Wadman. As near as I can determine he is the only person who has spent something more than a quarter of a century with one short break in the continuous development of Diesel journalism and publications which serve the Diesel industry. There have been other able men in the field, but no one else who has been steadily at it from the very beginning. For example, two men, Russell Palmer and T. Orchard Lisle, were in Diesel journalism before Wadman, but Palmer died several years ago and Lisle long ago became interested in oil industry magazines. In length of service Wadman stands alone and he certainly gives no one a grey-beard impression at the present time.

The first Diesel trade journal which Wadman built up from its beginning in 1924 was "Oil Engine Power." Later its name was changed and Wadman carried on with it until 1930 when changes in publisher and other problems took him away from the Diesel field for a short time, but only until he could lay the foundations of DIESEL PROGRESS.

When I went to work for Wadman and carried on during the crucial years between 1926 and 1930 I quickly realized that we were not just tagging along reporting the Diesel industry. We were not so much a trade journal as we were a flaming campaign on behalf of the Diesel. I think that some of the things which

had their inception at that time, but which carried on in the Wadman tradition of Diesel journalism may serve both to illustrate this somewhat unusual concept of the role of a trade journal and certain specific journalistic contributions which Wadman initiated or which he made possible by permitting a most unusual degree of creative freedom to his editors.



The Author

1. *Terminology:* For some reason mainly connected with early patent claims related to the Hornsby-Akroyd engine and to the original licensing of the Diesel patents, in the English speaking countries we had fallen into the use of the word "oil engine" which permitted an endless amount of confusion between true Diesels and semi-Diesels, hot bulb engines, kerosene engines and other border-line types. Wadman felt that we should standardize on the word *Diesel* and we pointed out that Diesel was more truly descriptive; that European terminology had focused on *Diesel* and that popular news stories emanating from Europe always used the word *Diesel*. With this impetus the gradual swing to *Diesel* was accelerated and ultimately became the accepted generic terminology used in this country.

It is probably justified to say that this espousal of the term Diesel by the only non-marine publication in the field and by the only popular writer then writing about Diesels, helped considerably to standardize the terminology.

2. *Need for Better Technical Understanding of the Diesel:* With a few notable exceptions American engineering schools were teaching almost entirely steam power plant engineering. Possibly tucked away in a textbook somewhere

and tucked away in a dark corner of an engineering school laboratory there would be an old semi-Diesel. The engineering schools were not up to date on Diesel developments; American textbooks were few and far between; university-conducted Diesel research was virtually non-existent except for a project at Penn State. To meet the textbook need Wadman originated the "Oil Engine Power Plant Handbook" which went through several editions; he circulated a questionnaire among the engineering schools, the results of which were summarized in an A.S.M.E. paper entitled "Diesel Education"; he sponsored a move to get American manufacturers to put new Diesels into American engineering school laboratories; and he pushed university joint research as much as possible. Obviously these things were just a beginning, but they were first steps and they were effective steps forward.

One unexpected result of this campaign was that an American engineering school bought a Diesel, but it was a Krupp Diesel! The protests which were spearheaded by Wadman brought "Diesel agitation" to a new high, but when the fireworks subsided no one had any doubt that there was an alert and resourceful American Diesel industry and that it could serve any instructional needs which might develop.

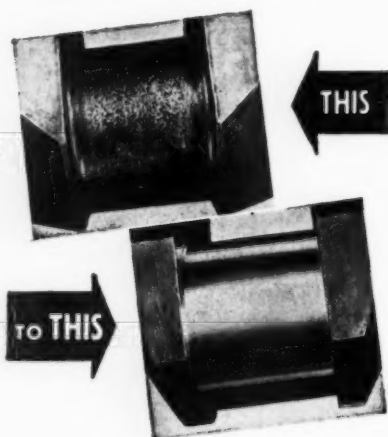
3. *Relationships with the Public Utilities:* Wadman and his staff and every one connected with the Diesel industry was becoming acutely aware of the rising competition between public utility systems and Diesel manufacturers for municipal power plant jobs. In some cases the Diesel lost out, as we shall see, because of competitive selling between Diesel manufacturers. In many other cases Diesels lost out because the cost figures used to justify Diesels were not representative enough of a large sampling of plants and because the figures used by utility men were obsolete.

Our handling of this problem was a classic example of Wadman's delegation of freedom to his editors and his backing if occasion demanded. We took the issue of accurate power costs to the directorate of the National Electric Light Association. The results were amazing. The N.E.L.A. officials agreed that no trade association could sponsor obsolete cost figures. They also agreed to consider the suggestion that possibly their dark view of Diesel economy was causing them to miss a bet when they could advantageously use Diesels in their own decentralized power plants. They agreed to cooperate with the newly created Diesel Power Costs . . . And now please turn to next page . . .

Don't SCRAP Crankshafts

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● You no longer need to commit all crankshafts to the scrap heap because journals are badly scored or burned. Many can be renewed to manufacturers' specifications by the new Bingham Sleeve Process. Saves *thousands* of dollars in motive power maintenance by prolonging crankshaft life. Let us send you the details.

For prices and literature, write today to Department DP-1

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More Than Trade Journal Man

. . . . Continued from page 67

Sub-Committee of the A.S.M.E. of which the author became a slightly bewildered member. A large delegation of utility executives came to Penn State when I read a paper called "The Diesel Engine and The Public Utilities" which threw the whole question open for a more constructive type of discussion.

Wadman, despite some qualms on the part of our publisher and despite a divided opinion in the Diesel industry, backed every effort focussed on one objective: to get the largest and most accurate compilation of the costs of power generation in as many Diesel power plants as possible. Then he characteristically took the ball and went a long step further.

He caused to be circulated at Penn State a cartoon showing a number of Diesel engine salesmen happily kicking each other in the pants while a municipal customer departed in company with a public utility power salesman. The general idea was "sell your own engine, don't try to unsell the other man's." Wadman knew the value of selling what you had to sell and of not getting entangled in competitive sales methods. At a time when his magazine was in violent competition with general power plant papers he never mentioned those papers. He just went along and sold the Diesel idea and "we got along," with greater and greater support from many manufacturers who had never thought of applying their equipment to the Diesel market until Wadman suggested it. The Wadman influence as "Diesel agitator," technical consultant, marketing expert, was a most unusual innovation, a broadening of viewpoint, in trade journal publishing and it still is.

4. *Popular Education on Diesel Power:* Most trade journal managers finding an editor with a yen for free-lance extracurricular writing would have fired him. Wadman took a different tack and suggested I could write all I wanted to for popular magazines if I was sure of my facts and if I wrote about Diesels. He also exerted a blue pencil on my MS in a way that was a combination of a surgical operation without anesthesia and a postgraduate course in concise popular writing. The result was that Wadman inspired a sudden outburst of popular articles on the Diesel which appeared in the New York Times, Scientific American, World's Work, The Nation and a number of other publications. One of these articles was reprinted by The British Diesel Engine Users Association and several other foreign magazines, including the Russian "Technique of the Aerial

Fleets" and an Arabic publication. Much of the popularization of the Diesel was tied in with spectacular developments, such as its possible use in aviation; its use in the German "pocket battleships"; in automotive applications, etc. The Diesel engine industry knew that Wadman was the mainspring back of this much needed publicity campaign. Again, we were "talking Diesels," not just running a trade journal.

5. *The Concept of One Diesel Magazine:* "One Engine Power" and its successor had always been companion publications to a Marine Diesel magazine. The whole question of how many magazines a publisher should sponsor in one field is a complex and interesting one. However much there are arguments on both sides, Wadman felt that the Diesel was a common denominator which would focus interest even if a shipping executive were suddenly confronted with a story on a railroad Diesel or if a municipal power plant executive learned that he could also use a Diesel in his motor cruiser. Wadman always wanted one paper to cover all Diesel applications. In a report prepared under his direction we alluded to the railroad field and other fields where one publisher sponsored several papers all somewhat over-lapping and then we compared them with "Automotive Industries" which combined in its pages a coverage of all automotive problems in one paper. There were also some other examples better found in a more formal journalism text than in this particular discussion. However Wadman was a convinced *one paper* propagandist and now he has his one paper. As such DIESEL PROGRESS may be regarded as a most remarkable example, possibly unique in trade journalism, of a magazine which reflects not only a remarkable personal influence, but which was built on a most diversified experience which included past association with every other Diesel trade journal in its most important developmental stage.

To students of trade journalism the Wadman development in relationship to American Diesel magazines carries with it a number of important lessons. Inherent in these lessons is the example which is offered of a concept of trade publishing which identifies itself closely with the problems of the industry it serves and which does it without "institutional" pretensions or without "authoritative" pretensions. Wadman has never preached to the Diesel industry; he has never let an editor develop into a "Mr. Whiskers." Wadman has been first and foremost a journalist and a most effective example of that all too rare concept of "more than just a trade journal man."

Strain Filter Condition

in One Operation with
WINSLOW FUEL FILTERS

1. Large particles of scale and other heavy impurities are cast into the settling sump by the Winslow Element's double fabric outer covering, which serves as a highly efficient primary strainer.

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Winslow makes over 100 complete units and over 200 different sizes and types of replacement elements engineered to fit any standard filter—in the marine, industrial or automotive field. For more than a quarter of a century Winslow has been pioneering the principle of "efficiency in depth" filtration. In offering the complete line of fuel filters and lubricating oil conditioners, Winslow presents a product evolved through years of scientific research. Be sure to clip the coupon below for complete details.



In addition to Winslow Fuel Filters on engines to catch pipe-scale, dust and moisture, it is recommended that all fuel be passed through a Winslow batch-type filter when pumping from storage tanks into operating tanks. Shown in this photograph are four Model 21-1645-BF Winslow fuel filters which are mounted in parallel in a pump house and which will accommodate a flow rate of 200 gpm.



WINSLOW ENGINEERING COMPANY

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Please send me, without obligation, more information and descriptive bulletins on the complete line of Winslow Fuel Filters and Lube Oil Conditioners.

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For AIR COMPRESSOR SERVICE

"Sales backed by Service" is not just a slogan with the Quincy Compressor Co. Careful attention has been devoted to setting up a nation-wide organization of Authorized Service Depots. Stocks of parts for the wide range of sizes and types of Quincy Compressors are maintained at these depots.



New SERVICE MANUAL

To assure greater satisfaction of Quincy Compressor users, a new Service Manual has been prepared for use by Quincy Authorized Service Depots. This 144 page book contains all the up-to-date details necessary to successful installation and servicing of Quincy Compressors. Look for the Quincy "Authorized Service" sign for prompt service on parts and help with air compressor problems!



QUINCY COMPRESSOR CO.

QUINCY, ILLINOIS

Branch Offices: New York • Chicago • San Francisco • St. Louis

RITCO DIESEL ENGINE PARTS

Produced accurately to your specifications in any metal... machined or ground... RITCO Diesel engine bolts, studs and other parts are of superior quality for heavy duty service. Bolts with precise, clean cut and rolled threads are made to 2" diameter. Nuts to 3½".

REMEMBER RITCO FOR

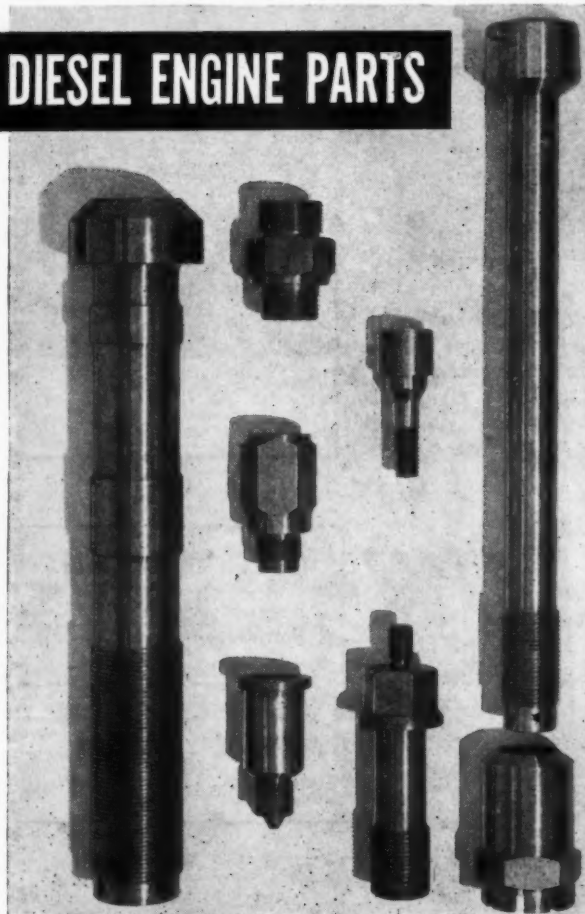
SPECIAL BOLTS, NUTS AND STUDS
ALLOY STEEL STUDS • MILLED BODY
BOLTS • DROP FORGING • HEAT
TREATING • DIESEL ENGINE BOLTS
AND STUDS

Let us quote on your specifications.

RHODE ISLAND TOOL CO.

148 WEST RIVER ST., P. O. BOX 1516
PROVIDENCE 1, R. I.

Serving American Industry Since 1834



Propeller Club Annual Stag



1,000 Propeller Club Members and their friends attended the annual stag of the Propeller Club, Port of New York. Above are seen some of the "Brass Hats" who attended. Reading from left to right (upper row): Lt. Comdr. A. M. Tode, USN (Ret.) Honorary President, The Propeller Club of the United States; Vice Admiral W. W. Smith, USN, Chairman United States Maritime Commission; Harmon Lewis, President Propeller Club, Port of New York, and President, Alcoa Steamship Company; (lower row) Admiral Thomas C. Kinkaid, USN; Fleet Admiral William F. Halsey, Jr., USN; and Vice Admiral Emory S. Land, USN (Ret.).

International Harvester Reduces Prices

INTERNATIONAL Harvester Company recently announced price reductions which it estimated will save the users of its products approximately \$20,000,000 a year and said its action was taken "because we believe there is nothing more important to this country than to lower the prices of the goods that people buy."

A statement by John L. McCaffrey, Harvester president, in explanation of the price reductions, said:

"We have undertaken this program despite the fact that our prices have not risen so much or so rapidly as the prices of most other industrial products. Government reports show that the prices of all manufactured products in the United States have risen 62.5% since 1941. In that same period, prices of our motor trucks rose 35%, our industrial power products 34%, and our tractors and farm machines only 25%.

"The American people insisted that the government withdraw from its attempts to control prices in peacetime. That placed the responsibility where it belongs—in the hands of business and industry. Not all business can reduce prices now. Not all can reduce by the same amount. Our company has felt a duty to act as promptly as possible. In our case, the business outlook now makes it possible to move toward the goal of lower prices.

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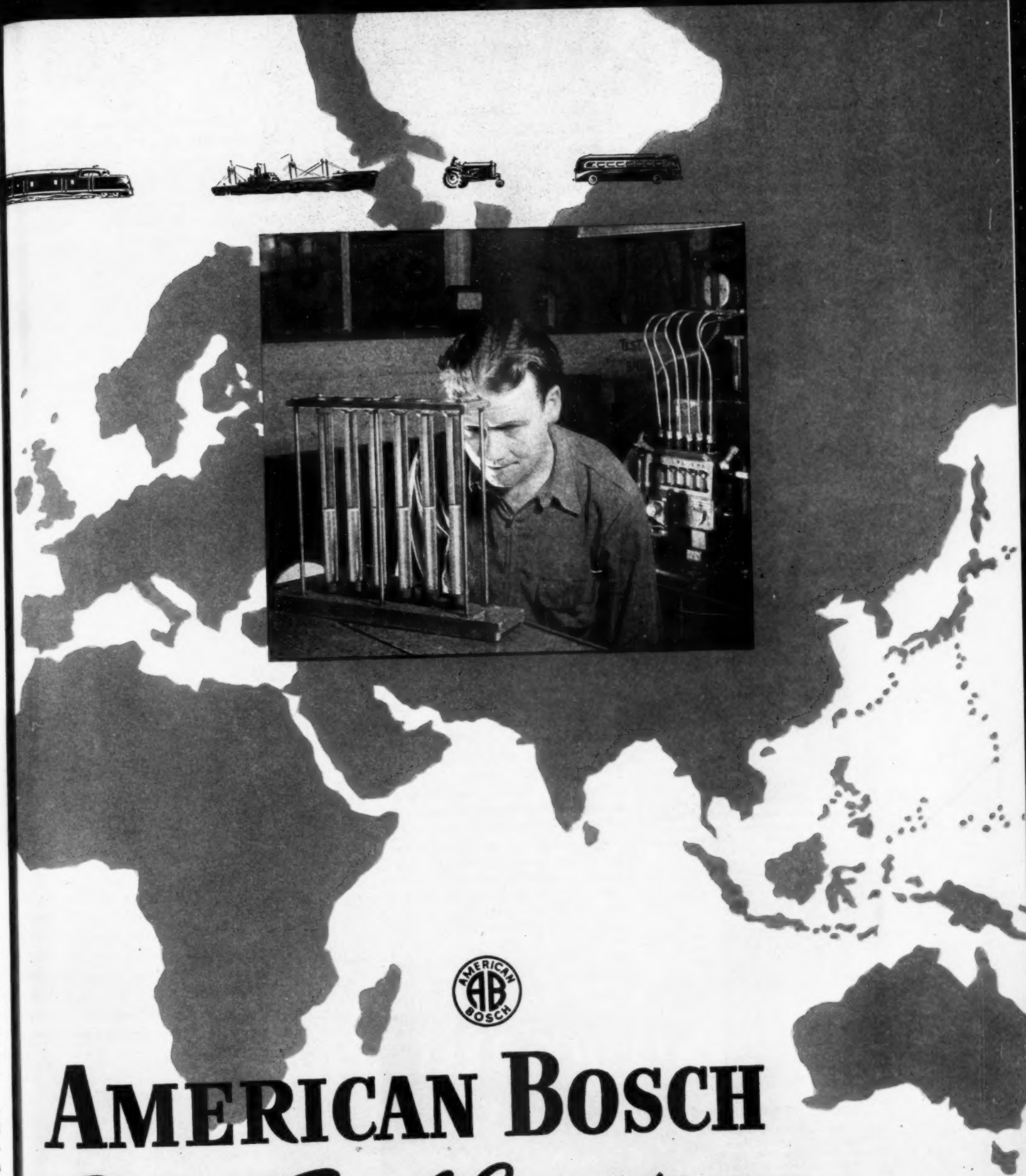
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PROGRESS



AMERICAN BOSCH

Diesel Fuel Injection

S.A.E. Summer Meeting

THE S.A.E. 1947 Summer Meeting will be held in the French Lick Springs Hotel, French Lick, Indiana, June 1 to 6. As announced by General Manager John A. C. Warner, of the Society of Automotive Engineers, the program opens with a "Family Album Party" and barber shop quartet competition between SAE Sections, then provides for morning and afternoon sessions from Monday through Friday with night sessions on four evenings. Among the invited speakers is C. F. Kettering, of Research Labora-

tories Div., General Motors Corp., Detroit, Mich., who will discuss "Fuels and Engines for Higher Efficiency" Wednesday evening.

A busy program is arranged for this meeting. The long list of technical papers emphasizes automotive and allied subjects with many of special interest to the Diesel-minded spotted throughout the program. Among the subjects in the latter category, the following are noted:

Monday Morning, June 2—"Utilization of Chas-

sis Dynamometers and Maintenance Record Analysis to Improve Operating Economy," by E. J. Gay, Ethyl Corp., Detroit, Mich.

Monday Afternoon — "Corrosion-Resistant Metals for Valves and Seats on Heavy-Duty Engines," by A. T. Colwell, Thompson Products, Inc., Cleveland, Ohio.

Tuesday Morning, June 3—Truck & Bus Session, Chairman M. C. Horine, Mack International Truck Co., New York.

Wednesday Afternoon—Annual Field Day, Outdoor Recreational Session, Chairman Sam Dickey, Lakewood, Ohio.

Thursday Morning, June 5—Fuels & Lubricants Session, Chairman, J. R. Sabina, E. I. du Pont de Nemours & Co., Wilmington, Del.—"The Effect of Lubricating Oil on Engine Cleanliness," by F. C. Burk, C. H. vanHartesveldt, and J. C. Geniesse, The Atlantic Refining Co., Philadelphia.

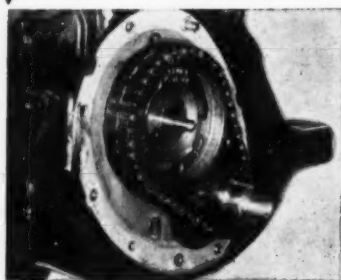
Friday Morning, June 6—Diesel Engine Session, Chairman, W. G. Ainsley, Sinclair Refining Co., East Chicago, Ill. — Symposium on Cylinder Wear. "Piston Rings," by K. H. Effmann, Perfect Circle Co., Hagerstown, Ind. "Engine Operation," by L. A. Blanc, Caterpillar Tractor Co., Peoria, Ill. "Lubricating Oil," by B. M. Berry, California Research Corp., Richmond, Calif. "Fuel," by A. J. Blackwood, Standard Oil Development Co., Elizabeth, N. J. "Instrumentation," by N. C. Penfold, Armour Research Foundation, Chicago.

The program has been arranged so that sessions are held at separate hours both morning and afternoon to facilitate presentation of all papers without conflict. Travel plans contemplate special trains direct to the hotel with reservations available to members through local representatives of the Baltimore & Ohio, Monon, and New York Central Railroads. The hotel's private airport will be open for SAE members travelling by plane.

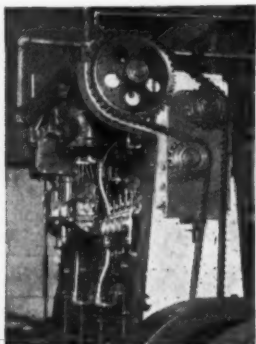
New Motor Folder Available

PUBLICATION No. 188, a die-cut 4-page folder in three colors, shows cutaway views and details of construction of new E-M "Heavy Duty" squirrel-cage induction motors designed for drip- and splash-proof construction in large power ratings from 100 to 1000 hp, 1800 rpm and lower. Write for your copy of this interesting folder to Electric Machinery Mfg. Company, Minneapolis 13, Minnesota.

IMPROVE **DIESEL** DESIGN AND **PERFORMANCE** WITH **LINK-BELT** CHAIN DRIVES •



For over 43 years, Link-Belt camshaft and auxiliary chains have been standard equipment on leading makes of motor cars, trucks and buses.



The advantages of L-B Silver-link roller chain on this Diesel engine are obvious.

Designs advance in various details, but fundamentals remain. Link-Belt silent chains and Link-Belt roller chains for timing, auxiliary and take off drives are standard for internal combustion engines. L-B chain drives have many distinct advantages; low initial installation cost, positive, smooth, quiet operation, flexibility of centers, to mention a few.

The designer has unlimited latitude for arrangement, and the user a maximum of efficiency and long life.

By virtue of their vast experience and unsurpassed production facilities, Link-Belt chain specialists can offer silent and roller chains of the highest quality, and helpful information to aid in making the most efficient and economical use of this important power source.

Consult Link-Belt engine specialists for aid on any phase of chain application.

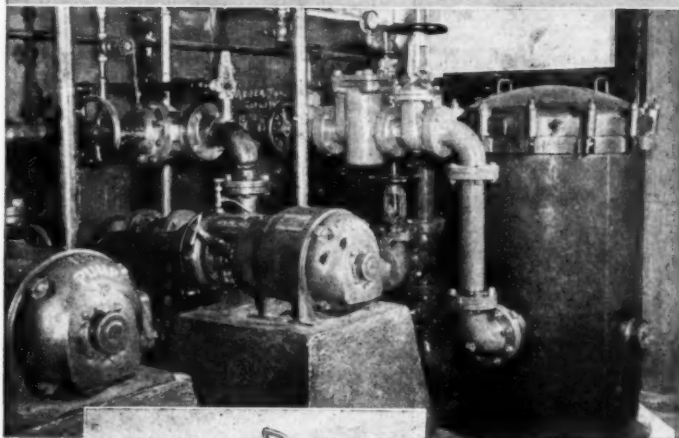
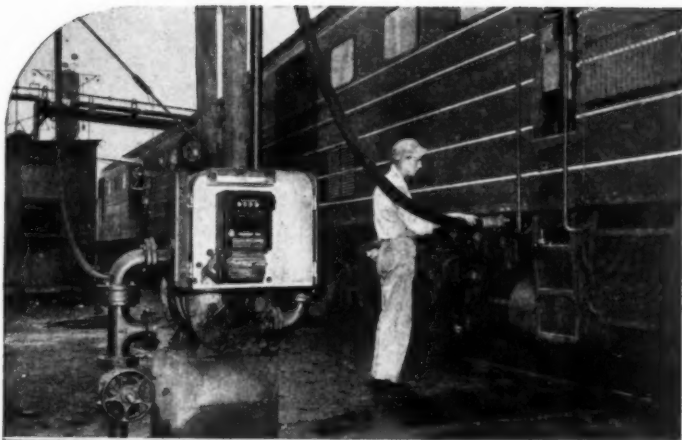
95,622



LINK-BELT COMPANY

Indianapolis 6, Detroit 4, Chicago 9, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8.
Offices in Principal Cities.

LINK-BELT
Diesel
CHAIN DRIVES
SILENT AND ROLLER TYPES



Bowser's finer filtration costs less than 5¢ per 1,000 gallons (cartridge replacement) proved by recorded tests totaling over 6,000,000 gallons.

Here's How BOWSER CUTS COSTS

Metered deliveries of clean Diesel fuel provide accurate cost accounting records for each piece of equipment.

Bowser cartridge filters, tested and proved by railroad men, provide cleaner fuel which minimizes wear on equipment and drastically reduces trouble.

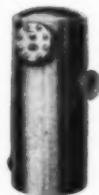
Contact your Bowser representative for full details of Bowser Diesel fueling systems.

BOWSER, INC.

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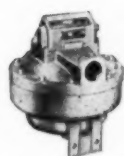
ESTABLISHED 1885



AIR RELEASES



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LUBE OIL DISPENSERS



PETROLEUM PUMPS

Liquid Control Specialists Since 1885

Nordberg Appoints Charles E. Beck



Charles E. Beck

ANNOUNCEMENT is made by Nordberg Mfg. Company of the appointment of Charles E. Beck as Special Representative of its Heavy Machinery Division. For more than 35 years Mr. Beck has been associated with the Diesel engine industry. Following his graduation from Armour Institute of Technology in 1911, he became District Manager of the Chicago office of the De La Vergne Machine Co. In 1916 he

opened the Kansas City office for De La Vergne and remained as District Manager until 1918. In that year he joined the Busch-Sulzer Bros. Diesel Engine Company as District Manager at Kansas City.

With the exception of a four year period when he returned to De La Vergne, he continued as District Manager at Kansas City until his transfer to the home office of Busch-Sulzer at St. Louis where he was engaged in wartime production of Diesel engines for that company. In 1944 he became Sales Manager of Busch-Sulzer and continued in that capacity until the acquisition of that company by Nordberg in December 1946. At present Mr. Beck will have his headquarters at the Busch-Sulzer Division of Nordberg at St. Louis.

Detroit Diesel Appoints Griffin Equipment Corp.

DETROIT Diesel Engine Division of General Motors, has appointed the Griffin Equipment Corporation, 881 East 141st Street, New York 54, N. Y., as exclusive Industrial Distributor for GM Diesel power in Metropolitan New York, southern New York State and northern New Jersey. All sales and service activities will

be in charge of H. J. Hush, Vice President of Griffin Equipment Corporation.



H. J. Hush

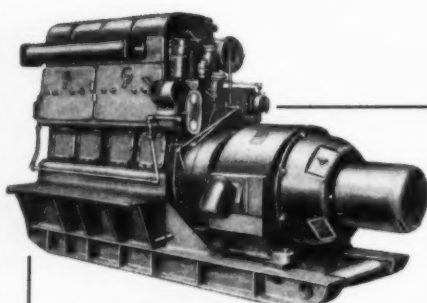
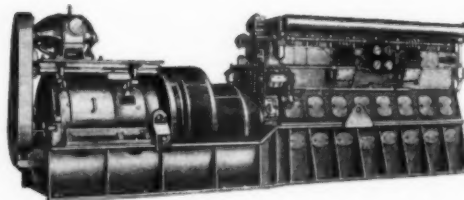
A new building will be erected at 880 East 141st Street, New York 54, which will include a duplicate of the "Model Parts Department" developed at the GM-Detroit Diesel plant, and a large showroom with a complete stock of GM Diesel engines and power units.



300 KW, DC COOPER BESSEMER DIESEL POWER PLANT

- Engine Model—FS 8 LH
- 510 HP @ 900 RPM Contin.
- 8 3/4" Bore, 11" Stroke
- Woodward Governor—UG8
- Cylinders—8
- Air Starting

WESTINGHOUSE GENERATOR—
300 KW., 240 Volts, D.C., 3 Wire, 900 RPM



100-125 KW CHICAGO PNEUMATIC DIESEL SETS

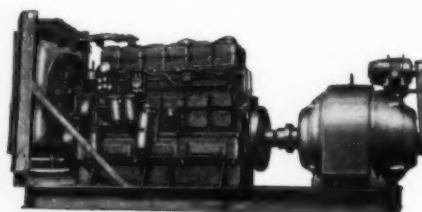
ENGINE SPECIFICATIONS:

- Type 49 CP—198 to 240 HP.
- 4 Cylinders—4 Cycle—Air Start—Bore & Stroke 9" x 10.5".

- General Electric Generator—3 Ph. Type ATI—Form EL

Panel Board..

Rating	At 60 Cycles	At 50 Cycles
KW	125	100
KVA	150	125
RPM	900	750



Ideal Generator Type SA Model 2BCD
3 Phase—Belted Exciter

125-150 KW. CUMMINS DIESEL SETS

Engine Specifications:

- Type LID—600
- 177 HP at 750 RPM—
- 250 HP at 980 RPM
- Air Start—
- Bore & Stroke—7 x 10 inches
- Woodward Governor—
- 4 cycle—6 cylinders

Rating	60 Cycles	50 Cycles
KW	150	125
Volts	240/480	242/428
RPM	900	750

Also 1 Cummins with 150 KWDC Columbia Generator—125 V—1200 Amp.

Wire, write or
phone your
needs
Main 4-5181

Benjamin's for Motors
130 CLINTON STREET
BROOKLYN, N. Y.
MAIN 4-5181

Russell Elected to Sterling Board

THE election of Robert Russell, Assistant Sales Manager of the Westinghouse Electric International Company, as a member of the Board of Directors of the Sterling Engine Company of Buffalo, New York, was announced recently by Addison F. Vars, Sterling's president.



Robert Russell

Mr. Russell, who recently returned from a business trip to Argentina, Brazil and other parts of Latin America, has been with Westinghouse since 1934. Before his appointment as Assistant Sales Manager he was in charge of the Special Projects Department which included contacting traction accounts in practically every country of the world.

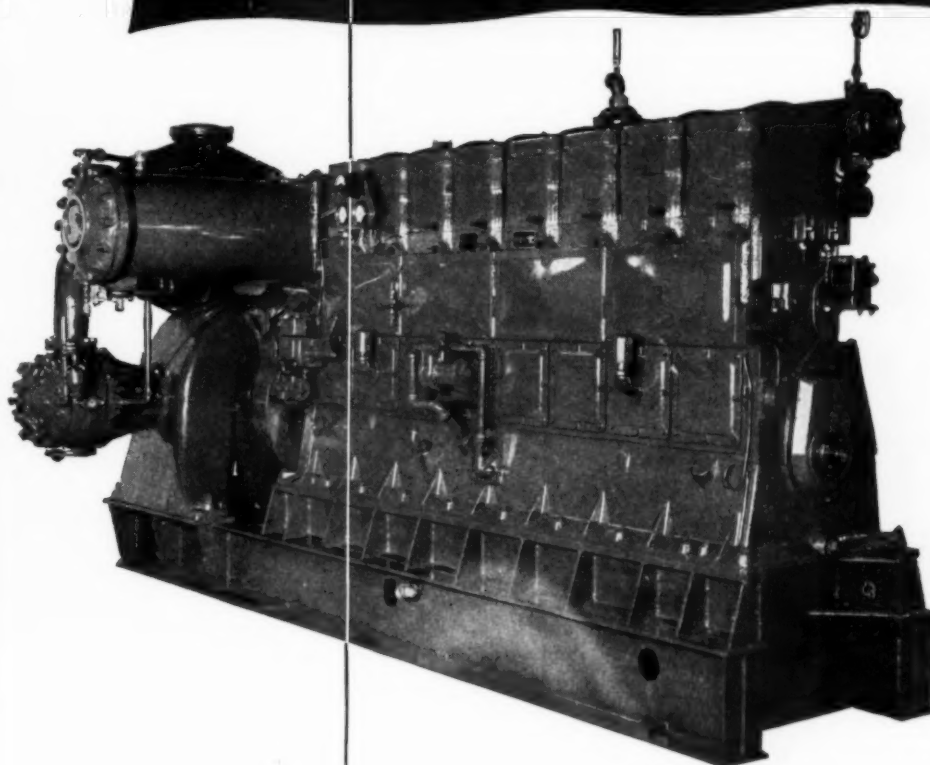
Mr. Vars said that Mr. Russell will bring to Sterling "a wide experience in the export business."

Globe Union Honors Employees

EMPLOYEES of Globe-Union, Inc., Milwaukee, with 25 or more years of service with the company were recently honored by C. O. Wamvig, President, who presented 4 employees with wrist watches on behalf of the company.

Receiving recognition for 25 years of continuous service were Lucille Nitzsche, order department, and Walter Heinn, battery division. Two other Globe-Union employees received additional recognition for service beyond 25 years. William Wilde, with 27, and Richard Bloss with 29 years, both with the battery division, were given wrist watches as mementos of the occasion.

guide to dependable engine performance



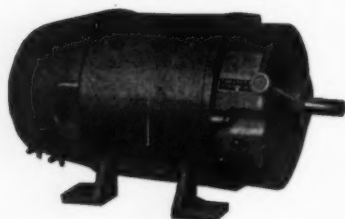
This Atlas Imperial 8 Cylinder Diesel is equipped with an Alnor Exhaust Pyrometer, giving a reliable guide to efficient engine performance. The importance of exhaust temperatures is universally recognized, and this dependable instrument provides a convenient means of securing an accurate record. Atlas Imperial is one of the many famous engine builders using Alnor Pyrometers for this vital service. There is an Alnor Pyrometer to meet the needs of any Diesel engine, large or small, afloat or ashore. Write for bulletins describing the complete line.

TYPE AX PYROMETER

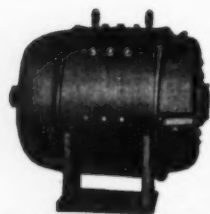


ILLINOIS TESTING LABORATORIES, INC.
420 N. LA SALLE STREET • CHICAGO 10, ILLINOIS

GENERATORS *AC and DC*



Well-known for their rugged design, efficient performance, long life and minimum maintenance, whether powered by electric, gasoline, or Diesel equipment. Backed by over 1/2 century of manufacturing and designing experience, Kurz and Root generators are now serving industries throughout the world.



DC generator (left) two-bearing, self-excited type. Can also be furnished with direct connected exciter. Both AC and DC generators can be furnished in the single bearing, flange-mounted type for special mounting requirements. Ball bearing construction is used throughout. Complete data upon request.



Illustrated are AC generators, only 2 of the many different types developed and designed to fit specific needs and applications. (upper left) two-bearing self-excited type; (lower right) two-bearing, direct connected exciter type.



KURZ and ROOT Company
APPLETON - WISCONSIN
...and 25 motors and motor generator sets

Hoffmann Heads New Orleans Office for Superior Engine Division



R. E. Hoffmann

THE Superior Engine Division of The National Supply Company has opened a South-eastern Regional office at 531 Gravier Street, New Orleans, according to an announcement by Robert M. Pearson, Manager of Sales. R. E. Hoffmann, who has been manager of the division's office at Jacksonville, Florida, will be manager of the new regional office. A well equipped parts department has been established at the new office and complete sales and service facilities are available.

J. F. Tucker, Jr., field service engineer for the Oil Field Machinery and Equipment Division of The National Supply Company, also will have his office at the new address.

Titelflex Inc. Names Peters As Chief Engineer



Dr. M. F. Peters

HAERING
ORGANIC
GLUCOSATES
control
SCALE, CORROSION
and
ALGAE
in
INDUSTRIAL PLANTS

WRITE ON YOUR LETTERHEAD
FOR SPECIAL LITERATURE

D. W. HAERING & CO., Inc.
GENERAL OFFICES:
205 West Wacker Drive, Chicago 6, Illinois

DR. MELVILLE F. PETERS, formerly in charge of research at Titeflex, Inc., has been appointed Chief Engineer according to a recent announcement by Elbert E. Husted, president of the company. Before joining the Titeflex organization in 1943, Dr. Peters was a principal physicist at the Bureau of Standards in Washington, D. C., where he worked extensively on ignition systems for aircraft engines. His work there is covered by approximately seventy patents and is described in numerous publications of the Bureau of Standards and in trade journals. He received his doctor's degree in physics from Johns Hopkins University in 1931. He is a member of the American Institute of Electrical Engineers and is listed in American Men of Science and Who's Who in Engineering.

Winslow Announces Personnel Changes



J. D. Sanderson

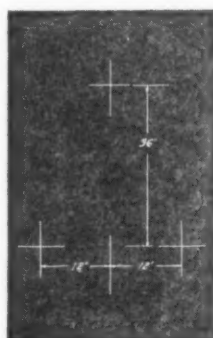
PROMOTION of a group of top executives and realignment of their duties has been announced by Winslow Engineering Company. According to Charles A. Winslow, president of the company, who made the announcement, the changes in assignment of personnel are the first step in a program of expanded sales.

Five men are affected by the changes. Their names and new positions are: L. L. Moore, vice-president and general manager; W. G. Nostrand, executive engineer; E. L. Helble, sales manager; J. J. Meyer, Jr., chief engineer; and J. D. Sanderson, factory superintendent, who joined the firm in August, 1946, after four and a half years as an officer in the United States Naval Reserve. A graduate of San Francisco State College, he makes his home in Berkeley, California.

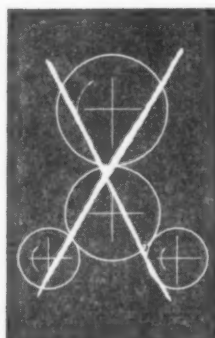
No. 5* of the Diamond Diesel Drive Dozen

WATER PUMP DRIVES

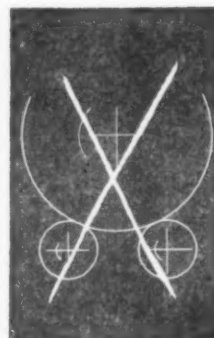
Diamond Roller Chains Accommodate Reasonable Center Distance Variations



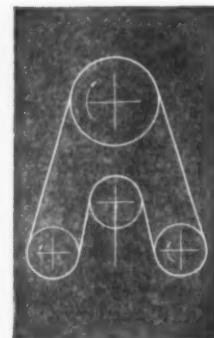
Shaft Location.



Gear Drive, 4 gears.



Gear Drive, 3 gears.



*Diamond Chain Drive.

As the sketches Nos. 2 and 3 show, gear drives for fresh and salt water pumps introduce disadvantages easily overcome with Diamond Roller Chain Drives. With gears there is difficulty in holding centers, noise develops with wear, pump speed may be too high, and gear replacements entail major delays and expense.



Experienced Diamond Engineers Know How To Put a Chain Drive On An Engine.

The adjustable Diamond Drive simplifies installation, remains quiet and makes unnecessary the absolute holding of center distances.

Loading is applied only within the pitch circle of the broad-based generously-filleted sprocket teeth, with loads shared among *many sprocket teeth* in mesh with the chain. Sprocket tooth wear is negligible.

Diamond engineers have valuable information on engine drives available on request. **DIAMOND CHAIN COMPANY, Inc.**, Dept. 407, 402 Kentucky Avenue, Indianapolis 7, Indiana. Offices and Distributors in All Principal Cities.

OTHERS OF THE DIAMOND DIESEL DRIVE DOZEN

1. Camshaft Timing Drives
2. Fuel Injection Pump Drive
3. Lubricating Oil Pump Drive
4. Fuel Supply Pump Drive
- *5. (See illustration above)
6. Generator Drive
7. Exciter Drive
8. Governor Drive
9. Air Compressor Drive
10. Tachometer Drive
11. Supercharging Blower Drive
12. Power Take-off Drive and Marine

DIAMOND ROLLER CHAINS



VIBRATION ISOLATION

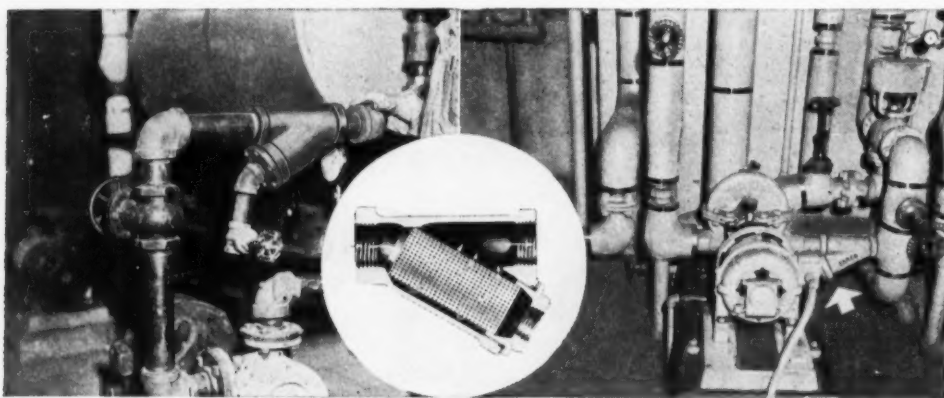


The #121 Vibration Eliminator is a most versatile unit type isolator. It's new but time tested. Developed during the war, it has been to sea where it had to prove itself in critical service. It's available for a load range between 400#-1700# per unit. Its all steel, welded

construction makes it tough and durable. The built-in rubber-in-shear isolation, and the unique design of overlapping steel collars separated by cork discs, restrict both vertical and horizontal motion. Quantity production brings the price down.

Write for the 24-page catalog to

The Vibration Eliminator Company, 10-28 47th Avenue, Long Island City 1, New York



Sarco strainer on fuel tank . . . Sarco strainer protecting water pump

SARCO STRAINERS FOR FUEL, LUBRICATING OIL AND WATER LINES

Shut downs due to foreign material in pipe lines are avoidable. In a few minutes, at little cost, a Sarco strainer with the exact mesh required can be inserted in any line.

Where the need for cleaning the strainer is frequent, Sarco hand or motor driven scraper strainers are available.

Four types in sizes 1/4 to 8" for pressures up to 900 lbs. Ask for Bulletin 1200.

SARCO
SAVES STEAM

SARCO COMPANY, INC.
475 Fifth Avenue, New York 17, N. Y.
SARCO CANADA, LTD., 85 Richmond St. W., TORONTO 1, ONT.

Codrington Announces New Appointments



T. E. Hughes



B. H. Gommel

GEORGE W. CODRINGTON, General Manager, Cleveland Diesel Engine Division, General Motors Corporation, Cleveland, Ohio, recently announced the appointment of T. E. Hughes as General Sales Manager and B. H. Gommel as Commercial Sales Manager. Mr. Hughes was for many years manager of the Washington, D. C., office, and Mr. Gommel was formerly service manager. Their headquarters will be at the division's plant in

Cleveland, Ohio. J. S.

Melton has been transferred from the Cleveland office to Mr. Hughes' old post as manager of the Washington office.



J. S. Melton

All of these men have been with the company for many years and are widely known

in the Diesel engine industry.

Executive Changes at Cummins

PROMOTIONS of two officials of the Cummins Engine Company have been announced by Hugh T. Miller, chairman of the Company's Board of Directors. The changes were effective January 1, 1947.

V. E. McMullen is now Executive Vice-president of the Company, and R. E. Huthsteiner is Vice-president and General Manager. Mr. McMullen, who has been serving as Vice-president and General Manager, joined the Cummins Engine Company, Inc., in 1935 as Factory Manager, after wide experience in the industrial field.

Prior to his promotion, Mr. Huthsteiner was Vice-president, Assistant General Manager and Controller. He joined the Cummins organization as Sales Manager in 1942 after many years in the sales field both in the United States and foreign countries.

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SIXTY- engineers

The management of the Cummins Engine Company, Inc., simultaneously announced the appointments of Leonard W. Beck as General Sales Manager and Waldo M. Harrison as Controller, both effective January 1. Mr. Beck has been serving as Acting General Sales Manager and Manager of the Company's Central Region. He now will relinquish the regional post. Mr. Harrison formerly held the position of Assistant Controller and Materials Manager.

New Chronometric Speed Indicator



"Jaquet" speed indicator seen above is one of several models offered by the Herman H. Sticht Company, Inc., of New York. These indicators are made in Switzerland and represent some of the best continental design. It is possible to measure accurately speeds as low as 1/10 of 1 revolution per minute and as high as 100,000 revolutions per minute. The indicators have a built-in chronometer movement which automatically engages and disengages the counting mechanism to insure proper timing interval.

61 Great Lakes Engineers Complete G-E Marine Course



Left to right: F. V. Smith, G-E Federal and Marine Divisions; Chief Engineers J. L. Johnson, Pickands, Mather & Company; W. Gustin, Columbia Transportation Co.; J. F. Sheppard, Cleveland Cliffs Iron Co.; W. B. Soderstrom, M. A. Hanna Co.; and L. T. Blaisdell, commercial vice president, General Electric.

SIXTY-ONE chief engineers and assistant engineers of five Great Lakes shipping com-

panies anticipating a record-breaking 1947 season recently completed a two-week marine course conducted by the General Electric Company at Cleveland, Ohio. The course, "Modern Marine Power Design," was planned and conducted by F. V. Smith of G-E's Federal & Marine Divisions.

The course covered description, characteristics, fundamentals, advantages, development, and practical application of modern marine power plant equipment. Mr. Smith stressed the practical aspects of operating marine equipment,

combining with it useful information on electricity and thermodynamics. He particularly emphasized economy of operation, pointing out that proper care and maintenance of existing equipment could result in substantial savings for operators.

Mr. Smith has had 36 years experience in the marine field, serving in World War I as a Navy repair officer. He has also conducted courses in marine power design for Naval officers at Columbia University and the post graduate school at Annapolis.

Where ECONOMY Counts . . .

**BUCKEYE
DIESELS
PAY!**

150-1440 H.P.
100-1000 KW

BUCKEYE POWER = EXTRA PROFITS

Today's narrowed profit margins make low cost power more important than ever before as a logical source of extra profits. Ever since 1908 — in thousands of stationary and marine installations — owners and operators have learned that the name "Buckeye" on an engine means **ECONOMICAL POWER**.

Buckeye owners will tell you that their savings in power cost represent a worthwhile profit that was formerly labeled "Operating Expense."

BUCKEYE ECONOMY and DEPENDABILITY

Every feature of Buckeye design and construction has been developed to bring the highest standards of dependability and economy to users of Diesel power. For example, Buckeye valve areas are larger because there are no valve cages. This increases combustion efficiency by providing faster air flow and quicker expulsion of gases. Crankshaft and connecting rod bearings are reversible, shell-type, silver alloy — made by an exclusive Buckeye process — and will last, with proper care, for the life of the engine. These and many other features are responsible for the low cost, dependable operation of Buckeye Diesels.

Buckeye engines are appreciated most where the going is tough . . . the service twenty-four hours a day . . . and a low cost source of dependable power is required.

Our engineering staff is always at your service. No obligation—no cost. Just write.

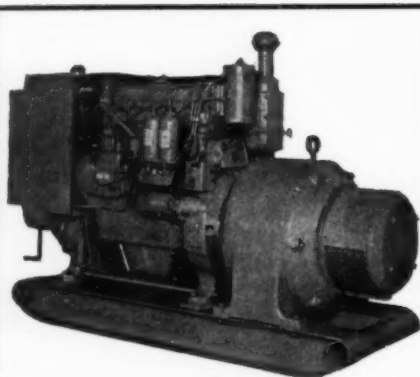


"Be Profit-Wise
and Dieselize
with Buckeyes"

THE BUCKEYE MACHINE CO.
LIMA OHIO



Engine
Builders
Since 1908



25 KW UNIT 1200 RPM

DIESEL GENERATOR UNITS

DC and AC; 50 and 60 Cycles

*Also compressor and pump units
and combinations designed and
built to order.*

EARLY DELIVERY

BOLINDERS COMPANY, INC.
35 Rector Street
New York 6, N. Y.

MCCORD Class S.F. LUBRICATORS

A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 16 feeds. New catalog on request.

RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE

MCCORD CORPORATION
DETROIT 11, MICHIGAN
LUBRICATOR DIVISION

D.E.M.A. Sponsors One-Week Educational Conference

AN intensive, one-week educational conference for college and university professors who teach courses in Diesel engineering has just been announced by the Diesel Engine Manufacturers Association at its Chicago office. The conference, combining tours of Diesel engine factories, visits to mechanical engineering school laboratories, and classroom lectures, is the first of its type ever to be given.

During the week of June 23, fifty professors from all sections of the country will headquarter at Chicago's Hotel LaSalle. They will follow a program that includes visits to engineering laboratories of the Illinois Institute of Technology and of Northwestern University, and factory tours of the General Motors plant at LaGrange and the International Harvester Company in Chicago. Supplementing these inspection tours will be classroom talks on various Diesel engine topics.

The program will open Monday, June 23, at the Illinois Institute of Technology. That day's events, arranged by the Institute's mechanical engineering department, include talks on Diesel engine characteristics, research work, lubrication and torsional vibration.

Buses will carry the professors next day to International Harvester Company's plant at Melrose Park, where a program will be presented by the company's engineering staff.

Northwestern University will be host to the instructors on the following day. After witnessing demonstrations in the mechanical engineering laboratory they will hear addresses on Diesel engine lubrication and vibration problems.

On Thursday, June 26, buses will transport the professors to the Electro-Motive plant of General Motors Corporation. The company's engineering staff will show the production of Diesel locomotives in successive stages to the visitors who "want to get from the factories what they cannot get in school," as one educator put it.

Concluding the week's course on June 27 will be a program of talks at Hotel LaSalle, delivered by members of the educational committee of the Diesel Engine Manufacturers Association, and by chief engineers of several of the Association's manufacturer members.

No entrance fee will be charged for the course, according to Gordon Lefebvre, Chairman of the

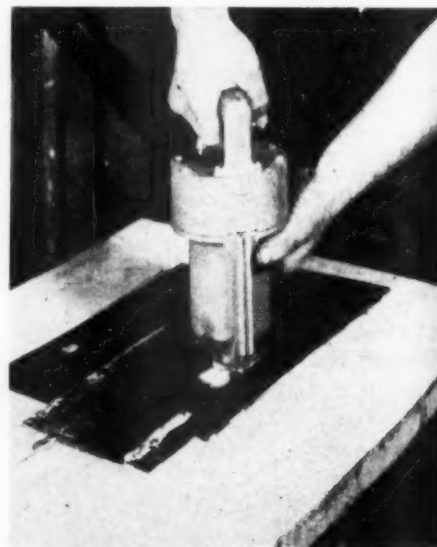
Association's Educational Committee, but the enrollment will be limited to fifty. Applications will be handled in the order they are received, Mr. Lefebvre said. Applications should be addressed to Diesel Engine Manufacturers Association, One North La Salle Street, Chicago 2, Illinois.

Electro-Motive Appoints Milton La Riviere

MILTON LA RIVIERE has been appointed Regional Manager of the St. Louis Region, according to an announcement by N. C. Denendorf, Director of Sales and Service of Electro-Motive Division of General Motors. Mr. La Riviere succeeds G. E. Anderson, who has retired after being in charge of Electro-Motive sales in the St. Louis Region since 1925.

Mr. La Riviere was Executive General Agent of the Atlantic Coast Line at Washington, D. C. before coming to Electro-Motive as District Sales Manager at Washington in October, 1944. He attended the Harvard School of Business Administration and Harvard University's Extension Institute, majoring in Transportation.

New Heat Gun for Induction Heating



New TOCCO heat gun in operation—silver soldering steel sheet.

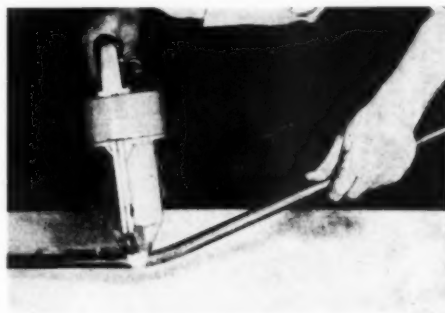
THE Tocco heat gun was first displayed last November at the National Metal Congress in Atlantic City. The possibilities inherent in "portable induction heating" have already attracted wide interest. Briefly the Tocco heat gun is a portable inductor coil—somewhat similar in function to the soldering iron and oxyacetylene torch. However, since the heat is generated within the workpiece itself the gun is much faster than a soldering iron or torch.

Also the danger of explosion frequently associated with the oxyacetylene torch is eliminated, the operator is not compelled to wear dark glasses, and the heat gun requires no preheating adjustment or control of any sort.

The operator places the nose of the gun against the piece to be heated, then simply pulls a trigger. This connects the gun electrically to a conventional 9,600 or 10,000 cycle generator—the required power source. Note, however, that small spacers on the nose of the gun prevent actual physical contact between the inductor and the work-piece. The induced currents in the load produce heat in the same way that heat is generated by current flowing through the filament of a lamp.

The Tocco heat gun itself weighs about eight pounds, and the leads are sufficiently light and flexible to permit easy handling by the operator. A run of 20 feet from the generator to the workpiece is practicable, and a longer run could be used where required. Note, that the heat gun is held in the operator's bare hand. No high-voltage hazard exists in its operation and the gun remains cool both thermally and

electrically. While a larger machine is sometimes desirable a generator rated at $7\frac{1}{2}$ kilowatts supplies enough power to heat about twice as rapidly as is usually possible with an oxyacetylene torch.



Heating $\frac{3}{8}$ in. bar stock for bending. Time—15 seconds.

For the plant performing job-shop type of operations where short runs of varied parts prevail the Tocco heat gun often eliminates the necessity of having a special inductor heating coil or inductor block for each job. Thus the advantages of induction heating are obtained without an excessive outlay for equipment, and changeover time when changing

from one job to another is eliminated. Also the use of flexible leads permits getting into certain tight corners where rigid leads or stationary inductors would be inconvenient.

The Tocco heat gun can be used successfully for a myriad of heating jobs. It has been found applicable for hardening, soft soldering, brazing, annealing and heating for forging and forming operations. It is adaptable to heating both ferrous and non-ferrous metals.

Electro-Motive Appoints Robert E. Hunter

ROBERT E. HUNTER has been appointed District Sales Manager of the Chicago Region, according to an announcement by N. C. Dezen-dorf, Director of Sales and Service of Electro-Motive Division of General Motors. Mr. Hunter formerly was Manager of the Statistics and Market Analysis Section of the Sales Department.

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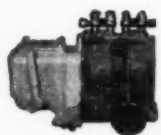
MANY OF THE WORLD'S FINEST DIESEL ENGINES ARE FACTORY-EQUIPPED WITH...

PIERCE GOVERNORS

★ For more than thirty years, Pierce engineers and field representatives have been meeting and solving difficult governing problems—and proving that *good* governing makes money for engine manufacturers and users alike.

That is the reason that Pierce Governors are standard equipment on many of the world's finest diesel engines—and the reason they are specified by thousands of engine users in all kinds of applications.

Pierce Diesel Governors are available in two general types—and many adaptations. They drive directly from the fuel pump—or independently of the fuel pump shaft. Both types are unsurpassed for accuracy and unfailing dependability—and trouble-free long-life. They often outlast the engines themselves without repair or readjustment. Wherever governing is required, *good* governing is best—and that means Pierce!

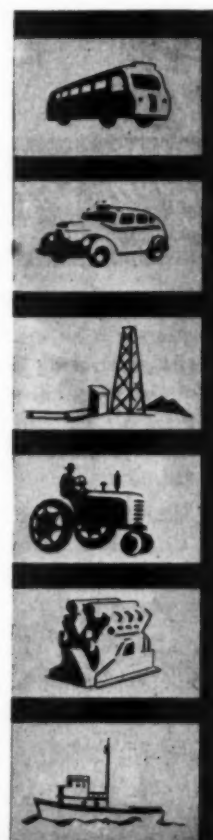


PIERCE GOVERNORS

THE PIERCE GOVERNOR CO., INC.

1603 OHIO AVENUE
ANDERSON, INDIANA

Manufacturers of Pierce Precision Governors and Sisson Automatic Chokes



Highest Quality
Gaskets & Oil Seals
by **FITZGERALD**
Gasket Craftsmen
for 41 Years

Gaskets of all types and materials to give reliable service under all Diesel operating conditions.

For full information write—

**THE FITZGERALD MANUFACTURING
COMPANY**

TORRINGTON, CONN.

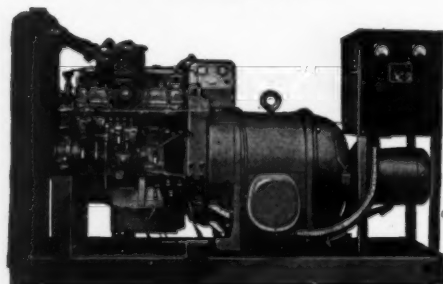
Branches: Chicago, Illinois; Los Angeles, California
Canadian: FITZGERALD, Limited, Toronto

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SINCE 1906
GASKETS
THE COMPLETE LINE THAT COMPLETELY SATISFIES

Generating Units
5 K.W. to 100 K.W. A.C. or D.C.

Close regulation of voltage and frequency is an outstanding feature of the generating units we build with either Diesel or gasoline prime movers. We are also equipped to supply any type of instrument panel required.

Manufacturers of engine generator sets for over 20 years.



Duplex Truck Co.
Lansing, Michigan

ENGINEERING SOCIETIES MEETINGS SCHEDULED

A.S.M.E. 1947 Meetings

Meeting	Place	Dates
Oil and Gas Power Division 19th National Conference	Cleveland	May 21-24
Aviation Meeting	Los Angeles	May 26-29
Wood Industries National Conference	Madison, Wisc.	June 12-15
Semi-Annual Meeting	Chicago	June 16-19
Applied Mechanics 13th National Conference	Schenectady	June 23-25
Fall Meeting	Salt Lake City	September 1-4
I.I.R.D. 2nd National Conference	Chicago	September 8-9
Petroleum Mechanical Engineering 1947 Conference	Houston	October 6-8
Fuel and Coal Division 10th Joint Conference	Cincinnati	October 20-22
Annual Meeting	Atlantic City	December 1-5

S.A.E. National Meetings

Personal Aircraft	Wichita	May 1-2
Summer (Semi-Annual Meeting)	French Lick Springs	June 1-6
West Coast Transportation & Maintenance	Los Angeles	August 21-22
Tractor Meeting	Milwaukee	September 17-18
Aeronautic Fall Meeting & Aircraft Engine Display	Los Angeles	October 2-4
Production Meeting	Cleveland	October 20-21
Fuels and Lubricants	Tulsa	November 6-7
Air Transport Engineering	Kansas City	December 1-3
Annual Meeting and Engineering Display	Detroit	January 12-16

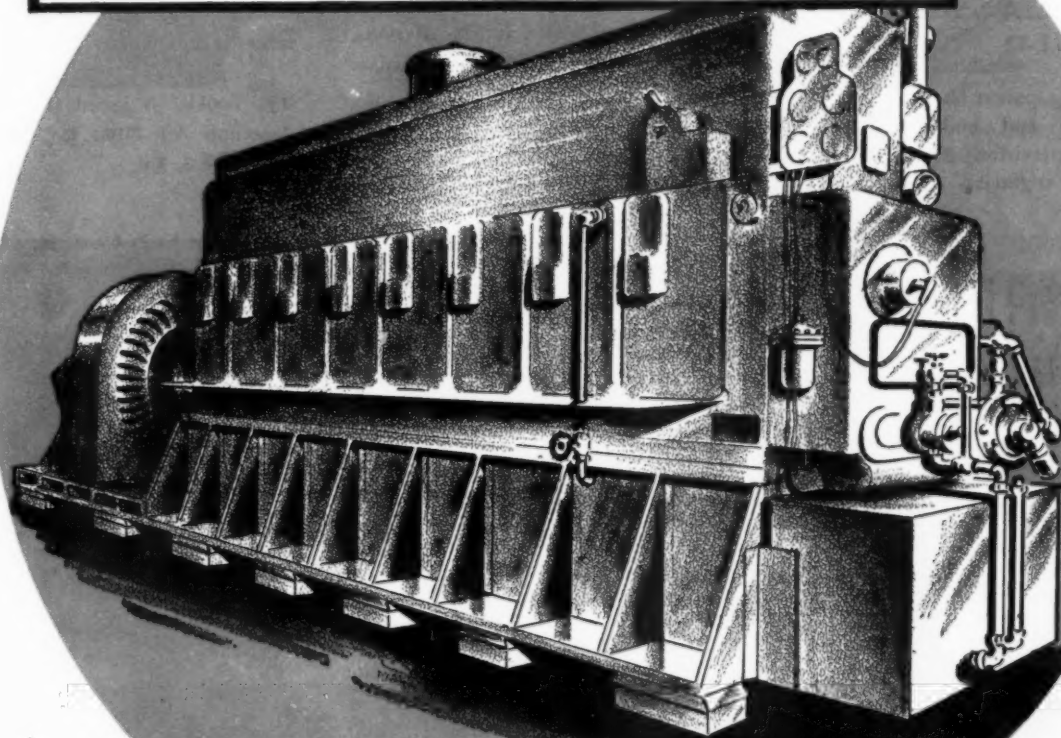
**John W. Anderson to
Relocate in the East**

ABOUT March 1st, John W. Anderson, widely known engineer and author, severed his connection as chief engineer of Atlas Imperial Diesel Engine Company, Oakland, California and announced that after attending to some personal matters including a vacation on the West Coast, he will again take up residence in the East. Mr. Anderson expects to locate in New York where he will be available for consulting work by September this year.

**Briggs Names Bennett
Midwestern Zone Manager**

THE appointment of Dale L. Bennett as Midwestern Zone Manager of the Briggs Filtration Company was announced recently by Chase Donaldson, Briggs' President. Bennett, a graduate mechanical engineer and until recently actively engaged in various engineering capacities in the Chicago area over a twelve year period will supervise the promotion of Briggs' line of Industrial Oil Filters in his district from headquarters in Chicago.

DELIVERY *Today!*



38 NEW BUCKEYE DIESEL ENGINES

★ 225 — 300 — 450 H. P.

★ 4—5—8 CYLINDER MODEL 80

★ .10 1/2 x 12 — 600 R. P. M.

ALSO COMPLETE GENERATOR PLANTS

150—200—300 KW

SEVERAL OTHER UNITS 100 TO 2000 H. P.

**DIESEL MOTORS
CORPORATION**

PORT WASHINGTON, L. I., N. Y.

TELEPHONE • ROSLYN 2000



Larger and smaller units shown on Page 9

DIESEL FUEL INJECTION SERVICE

by

Factory Trained Specialists



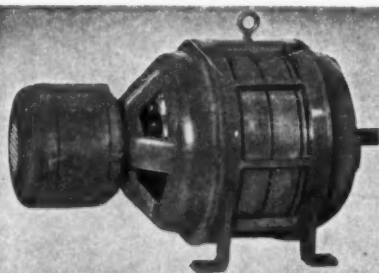
BOSCH
SCINTILLA
EX-CELL-O

Our Service Equipment has been designed and built under the supervision of factory service engineers.

The **DURHAM** Co.
INCORPORATED

17 W. 60 St.
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Syracuse, N. Y.



Columbia A.C. and D.C. Generators are built to meet highest performance standards. Complete range of application, including light, power, ship auxiliaries, or custom designed units.

D.C. UNITS range from 7½ to 200 KW.
A.C. UNITS range from 6¼ to 300 KVA.
Speeds and other specifications to meet requirements. Write for full information.

COLUMBIA ELECTRIC MFG. CO.
4519 Hamilton Ave., N.E., Cleveland 14, Ohio

COLUMBIA
GENERATORS
A.C. and D.C.

Socony-Vac Offers Educational Grants

SOCONY-VACUUM Oil Company, Inc., has announced the establishment of educational grants to enable outstanding employees in its research laboratories to study for advanced degrees. One candidate, selected each year from the laboratories, located in Brooklyn, N. Y., Paulsboro, N. J., and Dallas, Texas, will be granted a leave of absence, with full pay, for a period not exceeding three years. The first employee will be selected this summer. Candidates must have a bachelor's degree and must be employed by Socony-Vacuum for at least two years. Successful candidates, it is understood, will return to the employ of Socony-Vacuum for at least two years after receiving their degrees.

Comprehensive New Alnor Bulletin

THE Illinois Testing Laboratories, Inc., have just published a new bulletin devoted to the description of the various types of Alnor pyrometers now available. In addition to describing several models suitable for industrial use, the bulletin covers especially well those pyrometers designed for Diesel application. In recommending the type BZ and series A models for this service the bulletin goes into some detail. The type BZ are equipped with a D'Arsonval movement, a machine-wound, frameless moving coil; an Alnico magnet; and a sapphire jeweled movement. The accuracy of the equipment as a milli-volt meter is within plus or minus one per cent. The cases are dust, fume, and splash-proof. The switches for the instrument are either 8-circuit or 17-circuit and are of the rotary, double pole, multiple position selector type. These pyrometers are available for front board mounting only.

The series A pyrometers are suitable for direct mounting on a Diesel engine with the same general movement features found in the type BA model. In this model the multi-position selector switch is built as an integral part of the instrument assembly. The switch is a single pole type, breaking the negative side of each thermocouple circuit. It is available with 2, 4, 6, 8, 10, 12, and 16 circuits.

This interesting bulletin may be obtained by writing Illinois Testing Laboratories, Inc., 420 North LaSalle St., Chicago 10, Ill.

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11, BETTER DO IT TODAY, SEE
Page 98**

The Facts About Air Filtration

A NEW 23-page illustrated booklet compiled by American Air Filter Co., Inc., manufacturer of Air Filtration and Dust Control Equipment, discusses various types of industrial dust problems and typical applications of AAF air filters to such problems. Included in this highly enlightening booklet are a chart of size and characteristics of air-borne solids and sections dealing with atmospheric dust, and filtered air for industrial air conditioning, industrial ventilation, drying operations, product finishing, control of bacteria and mold spores, cooling electrical equipment, engines and compressors and miscellaneous industrial applications.

The booklet is issued free upon request by American Air Filter Co., 215 Central Ave., Louisville 8, Ky.

Former Sub-Commander Joins H. O. Penn Sales Force



Phillip F. Pierce

PHILLIP F. PIERCE whose 5 year war record included service on several submarines with one year in command of the U. S. S.-34, and a total of seven war patrols to his credit, recently joined the engine division of the H. O. Penn Machinery Co., Inc. His work in selling "Caterpillar" Diesel marine and industrial engines will be principally along the Connecticut and New England Coasts, working out of the Newington, Connecticut branch of the Penn organization.

Mr. Pierce is a graduate of University of Connecticut in 1941 and previous to his present connection was manager of the Gloucester branch of the Cummins Diesel Engines of New England, Inc.

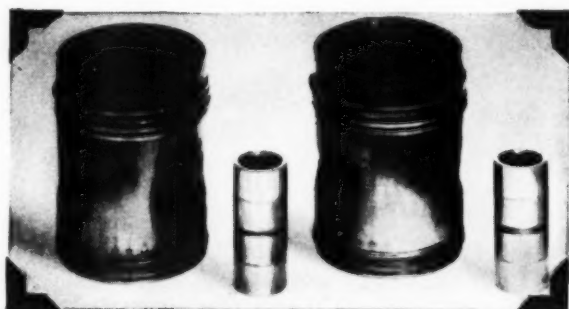
STANDARD ENGINEER'S REPORT



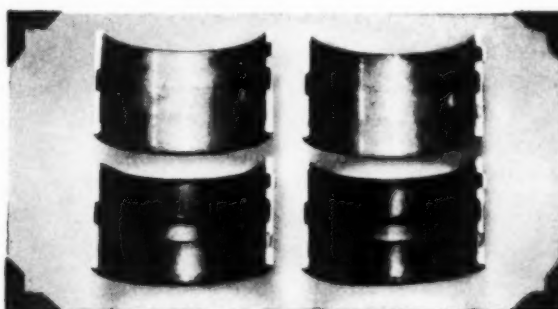
TEST DATA

UNIT *G.M.C. Diesel 6-71 Bus engine 6711367*
 LUBRICANT *RPM Delo oil SAE 20 and*
RPM Heavy Duty motor oil SAE 30
 MILES RUN *234,539*
 FIRM *L.A. Motor Coach Lines*
 LOCATION *Los Angeles*

DIESEL BUS ENGINE RUNS 234,539 MILES ON RPM OILS
 WITHOUT REPLACEMENT OF ANY PARTS



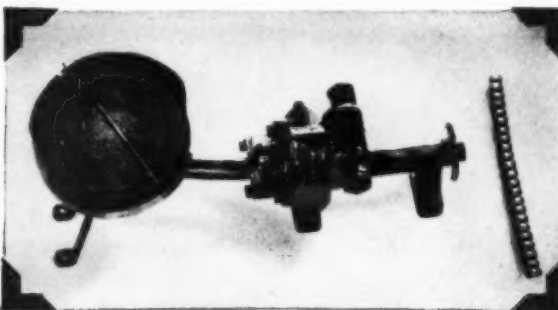
These pistons and pins came from a bus engine operated in city service for 234,539 miles on RPM Oils. As this photograph shows, they were unscratched and rings generally free. RPM Oils keep parts clean.



No cracks, pits or scoring appeared on main or connecting rod bearings. The highest wear measurement on any con rod journal was .0008"; on any main journal .0012". RPM Oils are non-corrosive.



All cylinders were smooth and varnish-free. Measurements on each showed wear from none to only .0035" near top of No. 4. No. 1 was .0013" out of round. RPM Oils stick on parts running or idle.



The oil-pump screen was clear of sludge and other foreign matter. RPM Oils are highly oxidation-resistant. Any sludge or loosened varnish and lacquer stay suspended and drain out with the oils.

REMARKS The test on RPM Oils ended at 234,539 miles without bearing failure or piston seizure. (The longest run on any other oil before failure was 177,000 miles.)

RPM DELO Diesel Engine Lubricating Oil SAE 20 was used for the first 66,000 miles of the test, RPM Heavy Duty Motor Oil SAE 30 for the last 168,539 miles. Both of these oils contain special compounds which clean varnish, lacquer and sludge from engine parts, prevent corrosion, resist oxidation and keep lubricant on hot and cold spots alike.

Trademarks, "RPM," "RPM Delo," Reg. U. S. Pat. Off.

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 THE CALIFORNIA COMPANY • Denver, Colo.

STANDARD OIL COMPANY OF TEXAS • El Paso, Texas
 THE CALIFORNIA OIL COMPANY • New York

Money-Saving Ideas on Diesel Maintenance Yours in FREE Folder

Send for your FREE copy of the new Oakite Technical Bulletin, "Diesel Engine Maintenance." You'll find it packed with step-by-step instructions for thoroughly removing oil, grease, scale and rust from Diesel engine water-cooling systems. Simplified ways of descaling water-jackets of air or gas compressors; cleaning lube oil coolers, fuel oil heaters, and the like. Its 4 fact-filled pages describe specialized Oakite materials and methods for every job you come up against in your Diesel maintenance-cleaning procedures.

Postcard-in for your copy NOW!

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Technical Representatives in Principal Cities of U. S. & Canada

OAKITE

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

For Better Crankshafts, Consult NATIONAL FORGE

We Make
Our Own
Electric
Steel



NATIONAL FORGE
& ORDNANCE CO.
Irvine, Warren County,
Pennsylvania

NEW STEEL TANKS

30—10,000 Gal. Cap. Horizontal
250—4,200 Gal. Cap. Vertical
7—12,000 Gal. Cap. Vertical
3—5,000 & 10,000 Bbl. Cap. Vertical

L. M. STANHOPE
ROSEMONT PENNSYLVANIA

Cooper-Bessemer Promotes Horace Sanders



Horace Sanders

THE promotion of Horace Sanders to Assistant Southwestern District Manager for The Cooper-Bessemer Corporation was recently announced by Stanley E. Johnson, Vice President and Director of Sales.

Mr. Sanders, who has been associated with Cooper-Bessemer for nearly twenty years, is well known throughout the Southwest territory, having been active in engine and compressor sales and engineering for the past thirteen years. In his new capacity, Mr. Sanders will assist A. A. Burrell, Southwestern District Manager in the administration of Cooper-Bessemer sales and service in that area.

Frank B. Powers Joins Baldwin

FRANK B. POWERS has joined The Baldwin Locomotive Works as Assistant to Vice President—Operations. Mr. Powers graduated from the University of Illinois in 1926 and is a well known figure in the field of transportation. He was Engineering Manager, Transportation & Generator Division of Westinghouse until 1945 and later Executive Vice President of the Great American Industries. His work at Baldwin will be mainly in connection with Diesel-electric locomotives.

New Book on Valve Gear Design

A COMPREHENSIVE treatise on the designing of cams, tappets, valve springs, and other valve gear units for internal combustion engines has just been announced as a publication of the Eaton Manufacturing Company.

Written by Michael C. Turkish, cam design engineer and mathematician for Eaton's Wilcox-Rich Division at Detroit, this book covers the whole field of cam design and includes chapters on springs, the observation of valve gear motion, and miscellaneous valve gear studies. It is replete with diagrams and formulae which makes it a valuable working handbook for both the student and the designing engineer.



New Eaton publication, Valve Gear Design.

Subjects treated include function of valve gear, methods of design, ramps required on cam contours, cam contours using flat followers, cam contours using roller or shoe followers, cam rings for radial engines using roller follower, modified cam designs, contact stress, and others.

Copies of Valve Gear Design are being placed in technological departments of libraries in principal industrial centers. Information may be had by addressing Wilcox-Rich Division, Eaton Manufacturing Company, Detroit 13, Michigan.

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FOR THE OIL GASOLINE & WATER CONNECTIONS

VELLUMOID

VELLUMOID VELLUMOID VELLUMOID VELLUMOID

There's VELLUMOID and?

There are other fibre gaskets but no real substitutes. VELLUMOID has been the standard gasket material for nearly thirty-five years. Why take chances with imitations.

THE VELLUMOID COMPANY, Worcester, Mass.

Sun Oil Acquires Diesel Tanker

SUN Oil Company recently accepted formal delivery from the U. S. Maritime Commission of the Diesel ship *Brandywine*, an 18,000 deadweight ton tanker built at Sun Shipbuilding and Dry Dock Company and operated by Sun during the war.

The *Brandywine*, which has been renamed the *Atlantic Sun*, is the third of three tankers recently purchased to restore Sun's tanker fleet to full pre-war strength. The *Atlantic Sun* replaces a ship of that name destroyed by enemy action during the war.

Acquisition of the *Atlantic Sun*, which is 521 feet long and 70 feet in beam, brings the Sun tanker fleet to a total of 17 ships representing a total of 249,740 deadweight tons. Powered by a Sun Doxford Diesel engine, the tanker ranges at 16 knots.

Sterling Names Edgar Martin Pacific Coast Sales Manager

THE appointment of Edgar Martin as Pacific Coast sales manager of the Sterling Engine Co., effective March 1, 1947, has been announced by Hans Bohuslav, Sterling Vice President. Mr. Martin will make his headquarters at the company's San Francisco office, 1040 Bryant St.

Widely known to the marine industry throughout the West, "Eddie" Martin joins Sterling after a long period of service to the industry for the Westinghouse Electric Corporation, more than 20 years of which were spent on the Pacific Coast as Marine Department representative, headquartered at San Francisco. In his new post, Mr. Martin will have charge of the sale of Sterling's complete line of Diesel and gasoline engines of medium horsepower for both marine and stationary applications, throughout the Pacific Coast territory.

Honeywell Appoints Johnson Sales Chief of Gas Controls

LYNN H. JOHNSON was recently appointed sales manager of the gas controls division of Minneapolis-Honeywell Regulator Company, it was announced here by A. H. Lockrae, vice president.

Joining the company in 1933 as a member of the production department, Johnson was later transferred to the sales department in the company's central region where he served until joining the U. S. Army in 1942. A graduate of Officers Training School, Johnson rose to rank

of captain in the Ordnance department. He rejoined Honeywell after the war and was assigned to the Cleveland office as assistant to the regional manager, a position he held until his latest promotion.

Correction Please

IN the March issue of DIESEL PROGRESS on page 103 we referred to a halibut boat built at the Sagstad Shipyards, Seattle, for Alfred Jangaard as being powered by a 165 hp. Gray Diesel. The engine, as we are informed by the Evans Engine & Equipment Co. of Seattle, is a 165 hp. General Motors Diesel.

MISOL

THE MILLER DIESEL FUEL ADDITIVE

THIS STARTLING NEW DISCOVERY
GIVES YOU CLEAN FUEL SYSTEMS AND
PEAK EFFICIENCY FROM TANK TO
COMBUSTION CHAMBER.

SAFE AND ECONOMICAL

Descriptive Literature and full information on request

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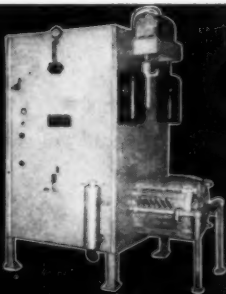
FOR CLEAN OIL

HILCO

OIL MAINTENANCE EQUIPMENT

WRITE FOR FREE LITERATURE

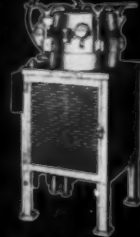
THE HILLIARD CORPORATION, 122 W. FOURTH ST., ELMIRA, N. Y.



AIRLINE OIL PURIFIER



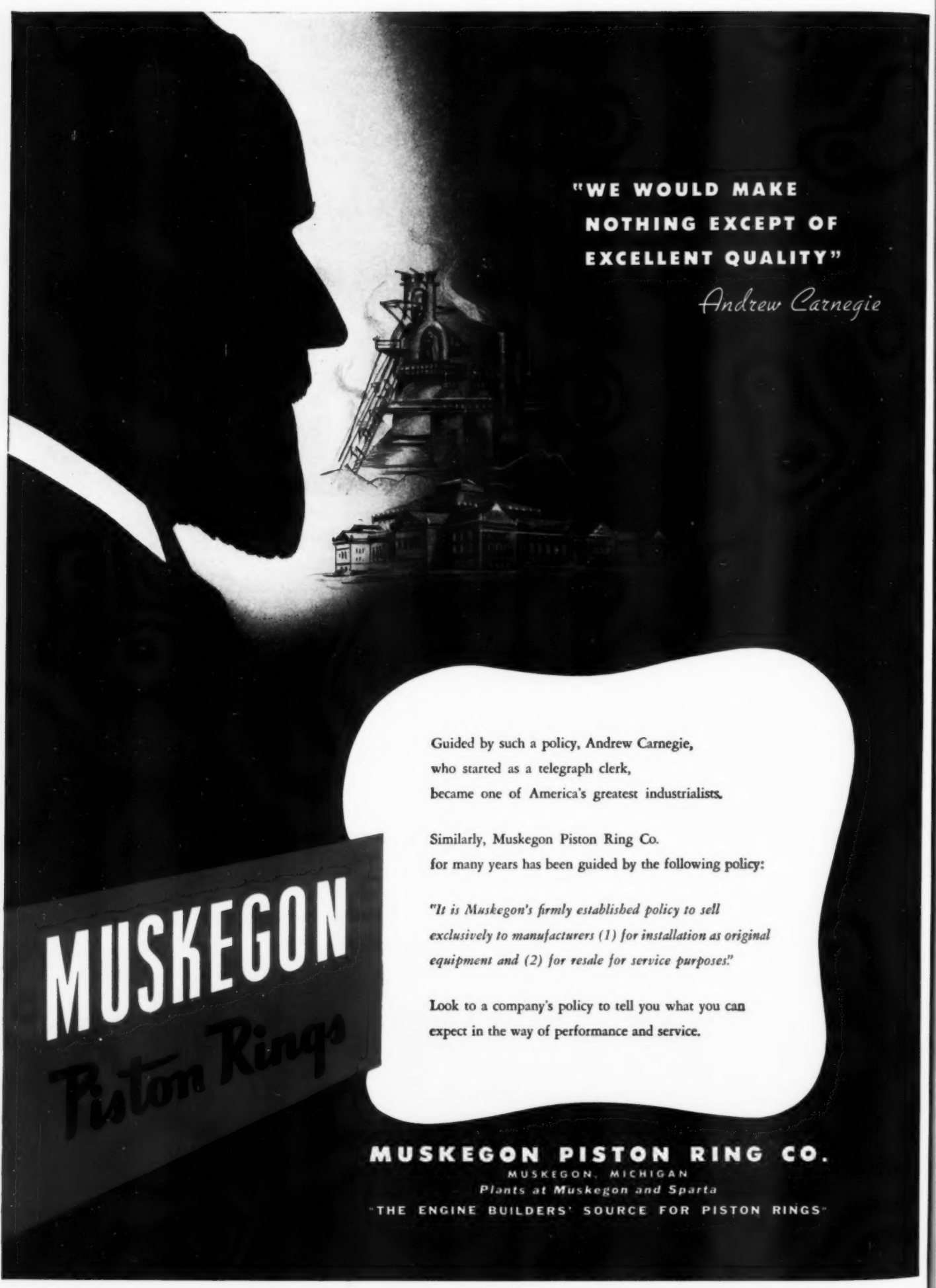
HYFLOW OIL FILTER



OIL RECLAIMER



THERE'S A HILCO FOR EVERY LUBRICATING,
FUEL AND INDUSTRIAL OIL PURIFYING PROBLEM



**"WE WOULD MAKE
NOTHING EXCEPT OF
EXCELLENT QUALITY"**

Andrew Carnegie

MUSKEGON
Piston Rings

Guided by such a policy, Andrew Carnegie,
who started as a telegraph clerk,
became one of America's greatest industrialists.

Similarly, Muskegon Piston Ring Co.
for many years has been guided by the following policy:

*"It is Muskegon's firmly established policy to sell
exclusively to manufacturers (1) for installation as original
equipment and (2) for resale for service purposes."*

Look to a company's policy to tell you what you can
expect in the way of performance and service.

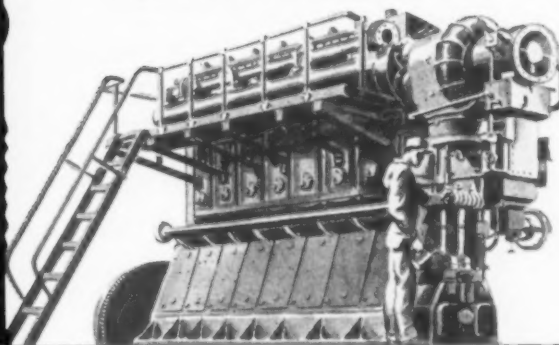
MUSKEGON PISTON RING CO.

MUSKEGON, MICHIGAN
Plants at Muskegon and Sparta

THE ENGINE BUILDERS' SOURCE FOR PISTON RINGS



*Removes Hard Carbon
Resists Sludging
Saves Wear & Repairs*
CUTS SHUTDOWN TIME



**NATURALUBE D. H. D.
IS GUARANTEED!**

*If you don't believe
that D. H. D. is the best oil
you have ever used,
Lion Oil Company will give you
your money back.*



More Power—Lower Operating Costs

Naturalube D. H. D. is refined from a basically different crude oil. It has *natural* ability to remove hard carbon, a naturally tougher protective film and greater *natural* penetrative and adhesive properties. It is non-corrosive—safe! And in addition, it is specially reinforced to give greater resistance to the formation of sludge and lacquer.

To Diesel owners and operators, that means that D.H.D. saves wear...saves repairs...keeps engines cleaner and able to deliver maximum power. Operating costs are lower because fuel and oil consumption is lower.

Leading engine manufacturers accept D.H.D. as a superior lubricant. For complete information about Naturalube D. H. D. ask your Naturalube Distributor or write direct to Lion Oil Company, El Dorado, Ark.

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Tried and proved in thousands of installations around the world, WITTE Diesel Engines and Dieselectric Plants combine simplicity with amazing efficiency, compactness and enduring dependability. They start readily on the same low-cost Diesel fuel on which they operate—affording up to 75% savings over gasoline powering. Quickly pay for themselves in steady production of machine driving power and dependable electric power and light. There's a WITTE Diesel unit to meet your exact needs. Write for new WITTE Catalog No. 11.



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PETROMETER CORP. 5 STAR SQ., L.I. CITY 1, N.Y.

New Decarbonizing Agent For Diesels

A NEW fast-action, hard-carbon dispersing agent, for the Diesel field, which dissolves and disperses carbon deposits, varnish, lacquer and sludges, has been developed by one of America's research institutes. This new solvent removes petroleum residues, leaving the metal clean and ready for re-use. Time and labor of scraping and buffing are eliminated. Directions for use are simple: submerge in warm solvent, agitate, and flush with warm water. The solvent is used with an agitator and leaves a protective film against rust.

Under the trade name, Industrial LIX-SOL, this new solvent is expected to become invaluable in all industries where carbon and other petroleum residues present a maintenance problem. It is especially useful in all overhaul operations on Diesel, gasoline and internal combustion engines working parts, turbines, high-pressure jets, carburetors, compressors, oil lines, hydraulic systems and regulating valves. For further information, write Coburn Mfg. Co., 4716 Trost Avenue, Kansas City, Missouri.

Erie Orders 34 New Diesels

THIRTY-FOUR locomotives costing \$7,186,000 comprise a recent order by the Erie Railroad according to R. E. Woodruff, president of the railroad. The order includes nine freight Diesels and twenty-five switching locomotives to be supplied this year by the American Locomotive Company, The Electro-Motive Division of General Motors, and the Baldwin Locomotive Company. The nine freight Diesels will serve on the line between Hornell, N. Y. and Jersey City, N. J. Upon delivery of these new units, the Erie will have a total of 82 Diesel engines.

FOR SALE

Buda Diesel 6-cylinder, $6\frac{1}{2} \times 8\frac{3}{4}$ 900 R.P.M. with starter and generator. Direct connected to 180 K.V.A., 3 phase, 60 cycle, 2300 volt. G.E. Generator. Complete with all controls and panel board. Price—\$3250.00.

1 Buda Lanova Diesel power unit, with Twin Disc clutch and pulley. Model 6LD 468-D-864 AB/M, 1200 R.P.M., serial 1752— $4\frac{1}{4} \times 5\frac{1}{2}$, 6 cylinder, 36 volt, Leece Neville starter and generator. No radiator or fan belt. \$525.00.

CLAPP, RILEY & HALL COMPANY

14 North Clinton Street
Chicago 6, Illinois

Water Fog Fights Fires

ACCORDING to F. S. Ehrman, General Sales Manager of Bowser, Inc., the concern has recently put into production an approved fire fighting equipment of the water fog type. The equipment includes 50 feet of $\frac{3}{4}$ inch high pressure hose with fog nozzle which will operate effectively at the pressures normally provided by city water systems.



Laboratory tests report a 20-foot fog projection at 50 lbs. nozzle pressure with a gallonage of 15.9 per minute. At 75 lb. nozzle pressure, the projection is increased to 25 ft. with a gallonage discharge of 19.3 per minute. Recommended to be located at points of greatest hazard, the fog nozzle produces a curtain of protecting fog in front of the operator, shielding him from the intense heat of the flame. Water fog has the ability to dilute vapors, washing the air so that it will reduce the danger to operating personnel.

For more information write Bowser, Inc., 1302 Creighton Ave., Fort Wayne 2, Ind.

Atlas Moves San Francisco Office

ATLAS Imperial Diesel Engine Co. announces the opening of new headquarters in San Francisco at 512 Brannen Street and the closing of their former sales offices on the ground floor of the Rialto Building at 102 New Montgomery Street in the congested uptown district. At their new location the company not only maintains sales offices and a large display room, but also parts storage and shop facilities for the repair of small engines, especially the Chrysler Marine Engines which Atlas distributes from Northern California to Alaska.

In charge of the San Francisco Branch is J. H. Czock, assisted by John Jones. Ed Dunk is responsible for parts and service.

New Caterpillar Cable Control

IN order to provide a lower cost rear-mounted double drum cable control unit for use with "Caterpillar" Diesel D6 and D7 Tractors. Caterpillar Tractor Co. is now producing a new cable control designated as the No. 23.

Designed to develop line pulls ample to meet service requirements imposed by the operation of scrapers, bulldozers and rippers, the new cable control provides smooth, easy operation with a minimum of adjustments.

AVAILABLE NOW! by The Million!

GASKETS

Prompt Deliveries, to hundreds of manufacturers who require gaskets in the production of their products, is more than a promise, at Fel-Pro. For, in our plants, we have the facilities to produce the type of gaskets you want, in the quantities you need, at the time you want them.

If your product requires some special, different kind of gasket, put the problem up to the specialized knowledge and experience of Fel-Pro's Engineering Department. Many of the largest manufacturers are Fel-Pro customers. FOR YOUR FREE FOLD containing 53 actual samples of materials suitable for Gaskets, Packing, Insulating, Dampening and Sealing, write today to the

INDUSTRIAL GASKETS AND PACKING DIVISION OF
FELT PRODUCTS MFG. CO., 1522 Carroll Ave., Chicago 7, Ill.

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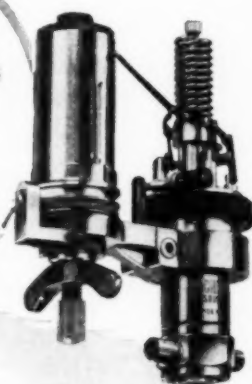
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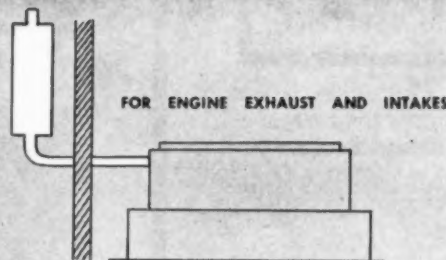


You can help maintain original engine efficiency, assure uninterrupted power and maximum fuel economy by making regular indicator check-ups with the Type 2-CP Indicator illustrated. It is the recognized "standard" card-drawing indicator for medium and moderately high speed Diesels, and is also in widespread use on steam engines, gas engines, compressors, and pumps.

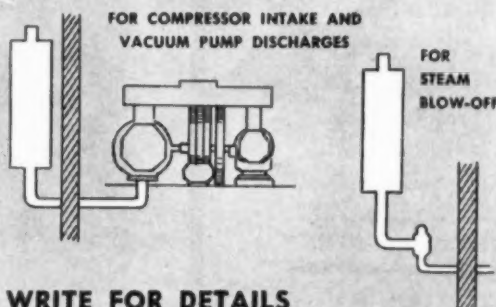
Write for Bulletin 293,
which gives full particulars.

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World's Largest Manufacturer of
Engine Indicating Equipment

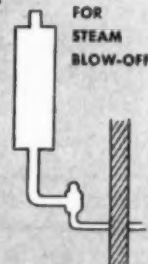
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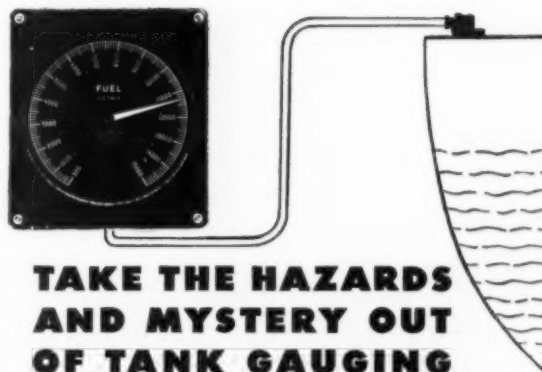


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Wherever fuel, water or other liquid must be measured, LIQUIDOMETER can provide a dependable gauge. These rugged, precision-built remote indicators have proven themselves by years of reliable performance in many exacting marine, railroad, aircraft and industrial applications. Remember these gauge essentials:

- Dependable performance
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If you have a liquid measuring problem write:

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NEW DIESELS

Immediate DELIVERY

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- 300 KW GENERAL MOTORS 230 V. D.C.
- 300 KW COOPER BESSEMER 230 D.C.
- 250 KW COOPER BESSEMER, D.C.
- 250 KW GENERAL MOTORS 230 V. D.C.
- 125 KW CHICAGO PNEUMATIC, 3/50-60
- 125 KW CUMMINS 3-60-220-440, 3/50-60
- 150 KW CUMMINS, 115 V. D.C.
- 100 KW SUPERIOR, D/C, 230/110
- 100 KW HERCULES 3/50-60/220-440
- 75 KW CATERPILLAR, 3/60/220-440
- 60 KW BUDA, 125 V. D.C. MARINE
- 60 KW GENERAL MOTORS, 3/50-60
- 60 KW HERCULES, 3/60/240
- 50 KW INTERNATIONAL 3/60/240
- 50 KW SUPERIOR, AC, 3 PH.
- 50 KW BUDA, 125 V. D.C. MARINE
- 40 KW HERCULES, DC, 115 V. MARINE
- 30 KW INTERNATIONAL, 3 PH.
- 30 KW HERCULES, 220, 3 PH.
- 30 KW BUDA LANOVA 50/60 CYC.
- 25 KW CHRYSLER, 3/60/127-220
- 15 KW HERCULES, 110/220, PH.
- 15 KW INTERNATIONAL, 1/60/120-240
- 15 KW WAUKESHA, 1/60/127-220
- 10 KW HERCULES, DC, 115

INDUSTRIAL ENGINES

- 300 HP SUPERIOR
- 200 HP MURPHY 6 CYL.
- 150 HP CLIMAX 6 cyl.
- 75 HP CHRYSLER
- 36 HP CLIMAX 4 CYL.
- 18 HP CLIMAX 2 CYL.
- 12 HP WITTE
- 9 HP WITTE
- 6 HP WITTE

MARINE ENGINES

- 300 HP SUPERIOR 2:1 RED.
- 160 HP ATLAS, 300 RPM, D.R.
- 165 HP GENERAL MOTORS 2:1, or 2.5:1, or 1:1.25
- 165 HP MURRAY & TREGURTHA
- 150 HP KERMATH DIESEL, 2:1 RED.
- 120 HP BUDA 2:1 RED.
- 125 HP HERCULES 1.5:1
- 90 HP CUMMINS

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5 RANGES IN
ONE INSTRUMENT

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100-400 RPM
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1000-4000 RPM
3000-12,000 RPM

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120-450 RPM
400-1600 RPM
1200-4800 RPM
4000-16,000 RPM
12,000-48,000 RPM

FOR DETAILS WRITE FOR BULLETIN NO. 750.

HERMAN H. STICHT CO., INC.
27 PARK PLACE NEW YORK 7, N. Y.

Harry Neal Baum Joins Gebhardt and Brockson Agency

HARRY NEAL BAUM, Advertising Manager of Fairbanks, Morse & Co. for more than ten years, has joined Gebhardt and Brockson, Advertising Agency, Chicago.



Harry Neal Baum

Mr. Baum has been closely associated with the metal working industries for many years and has successfully promoted the application of Diesel engines, centrifugal and turbine pumps, totally enclosed and other special types of electric motors, and allied equipment to the industry. He has been a director of the National Industrial Advertisers Association and his many friends know him to be an earnest advocate of sound and consistent advertising which gives the pertinent and essential facts to busy management men.

Brown Company Announces Promotions

HENRY M. SCHMITT has been named chemical industry manager of the Brown Instrument Company, Philadelphia. O. B. Pyle has been made industrial manager of the Philadelphia branch and A. W. Roat is now industrial manager of the St. Louis branch of the industrial division of Minneapolis-Honeywell Regulator Company.

The sales executive staff changes were made known by W. H. Steinkamp, field sales manager for Brown. At the same time Mr. Steinkamp announced that I. K. Farley has been placed in charge of the major petroleum accounts in the Philadelphia area and Harry D. Ruch will also work out of the industrial sales division at Philadelphia.

Hercules Diesel Engine Makes News In England



This ex-British Army Diamond T tractor operated by Pickfords of London, England, is powered by a Hercules DFEX 5 3/8" x 6" Six cylinder Diesel engine.

A HERCULES Diesel Engine manufactured by the Hercules Motors Corporation of Canton, Ohio, recently made motor news abroad. The conversion of a Diamond-T truck-tractor built for the British Army and powered by a Hercules 6 cylinder Diesel engine from military to peacetime service was the subject of a photograph and caption published in London, England, by Illiffe & Sons, Ltd. The tractor's Hercules engine develops 201 b.h.p. at 1,600 r.p.m. "The main Fuller gear box gives four forward speeds and reverse, and the auxiliary gear box has three ratios," the caption states.

Pickfords is probably the largest single firm in England carrying out the function of shipping agents and carriers, comparable in operation to the Railway Express agency in this country, handling anything that requires transportation both inland and overseas.

Ladish Establishes Atlanta Office

THE Ladish Co. recently announced the establishment of a new district office in Atlanta, Georgia and the discontinuation of its New Orleans office.

The new office will be located at 452 Spring Street, N.W. and will serve the southeastern territory. W. W. Bowie, formerly manager of the New Orleans office, has been appointed manager of the Atlanta office to direct the sale of the complete line of Ladish Controlled Quality Seamless Welding Fittings, Ladish Forged Steel Fittings and Ladish Forged Steel Flanges in this territory.

IF YOU HAVEN'T ORDERED YOUR COPY OF THE LATEST DIESEL ENGINE CATALOG, VOL. 11, BETTER DO IT TODAY, SEE Page 98

Makes

New Bulletin on Bulk Storage Tank Preheater

A NEW and practical method of heating oil or other heavy bodied substances in the bulk storage tank before they enter the suction line is described in a new bulletin just issued. The bulletin gives complete story of how the "Hot Spot" functions.

A copy of the bulletin and complete information can be had by addressing Rempe Company, 340 N. Sacramento Blvd., Chicago 16, Illinois.

Gleaned From Buckeye Pipe Line Annual Report for 1946

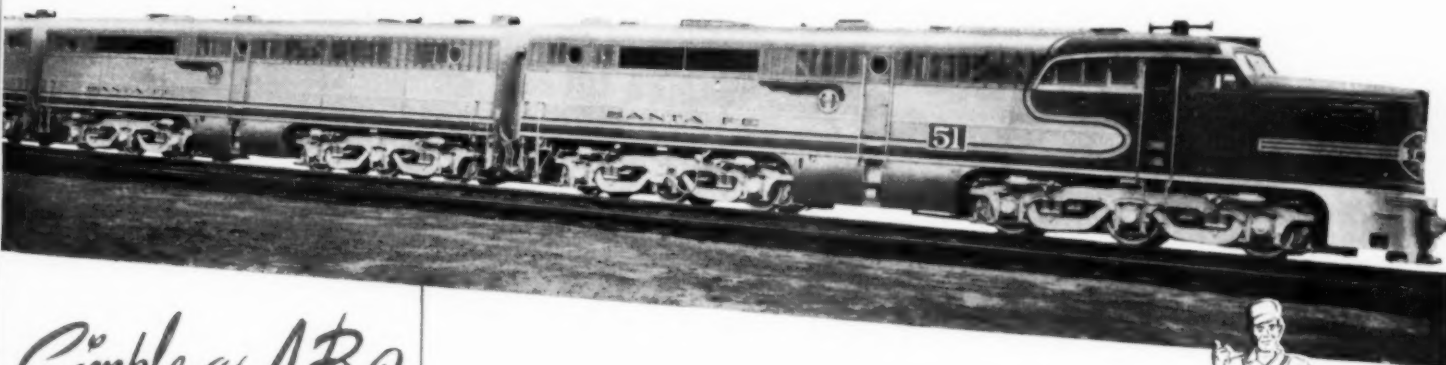
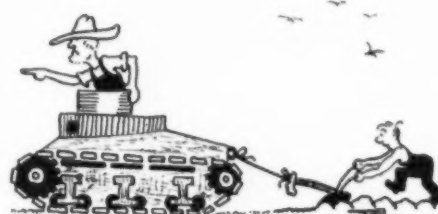
"MANY of our pumping stations that have served us well in the past were built over 40

years ago and have become obsolete and in need of replacement. Accordingly, work has been started on the installation of modern Diesel engines and pumps, at an estimated cost of approximately \$2,250,000. We anticipate that this will result in a considerable saving in operating costs . . ."

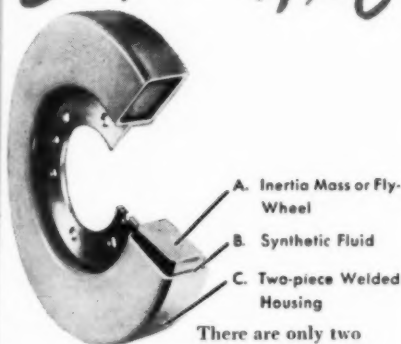
New Twin Disc Hydraulic Coupling

THE latest issue of "Production Road," Twin Disc Clutch Company's magazine just off the press, is devoted exclusively to photographs, charts, and short articles which relate the complete story of the company's newest product, a small hydraulic coupling successfully tested for more than a year on electric motors and internal combustion engines in the 1 to 25 hp. range.

The magazine contains a non-technical explanation of the way the Twin Disc Clutch Company has utilized the hydraulic principle in both the familiar, large Twin Disc Hydraulic Coupling and the new, smaller unit. Short, illustrated articles describe six of the major advantages derived by teaming the small hydraulic coupling with power units. Copies of the new publication may be obtained free by writing the Twin Disc Clutch Company, Racine, Wis.



Simple as ABC



There are only two essential parts to the Houdaille Torsional Vibration Damper . . . the housing and the inertia mass or fly-wheel. Since the two-piece housing is hermetically sealed by welding and there are no wearing parts, there is no service, repair or replacement problem. Because of the relatively flat viscosity curve of the synthetic fluid used, temperature does not materially affect the damper's efficiency.

6,000 H.P. FOR 100 M.P.H. PASSENGER SERVICE—

And American Locomotive Uses a
**HOUDAILLE* Viscous Damper on each
2,000 H. P. Diesel Unit**



The Houdaille Viscous Torsional Vibration Damper is versatile. It has proven its efficiency in minimizing crankshaft vibration on both gasoline and diesel engines ranging from 80 H.P. at 4,000 R.P.M. to 1,200 H.P. at 300 R.P.M.

And now American Locomotive has adapted it to another use. On each of the Alco 2,000 H. P. Diesels found in many of the country's sleekest postwar locomotives, a Houdaille

Damper is incorporated for torsional vibration control on the extension shaft of the compressor which drives other auxiliary equipment.

Thus once again the Houdaille Viscous Torsional Vibration Damper is proving itself in practical use. Houdaille engineers will gladly discuss its application with any engine manufacturer in the internal combustion field.

HOUDE ENGINEERING DIVISION OF
HOUDAILLE-HERSHEY CORPORATION
MAKERS OF HYDRAULIC CONTROLS
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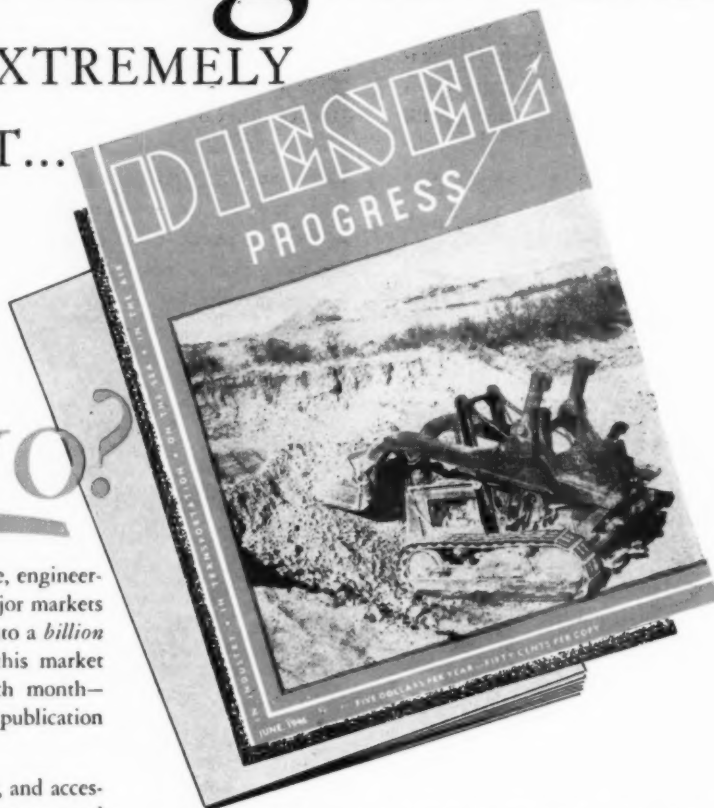
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DIESEL PROGRESS is directed to the executive, engineering, sales and purchasing personnel of the 22 major markets which combine to make their Diesel activities into a *billion dollar industry*. DIESEL PROGRESS reaches this market completely—with nearly 15,000 circulation each month—87.5% more than the circulation of any other publication which caters to it in any degree.

DIESEL PROGRESS covers engines, equipment, and accessories—their application, production and maintenance—and the new technical developments in every field of operation. Editorially it covers the Diesel field with unmatched thoroughness. During the past year more than 30 outstanding authorities, in addition to the regular staff, contributed from 1 to 19 complete articles.

DIESEL PROGRESS is the *Big Book* of the Diesel industry. It is big in format—you would call it "Life" size—with ample opportunity for large impressive illustrations, charts, diagrams. Its eye-appealing, colorful editorial section each issue



makes it highly attractive to readers—highly resultful for advertisers. For an impressive sales job, advertisers like the large 8½" x 11" standard type size pages and the larger 10½" x 13½" bleed pages.

WRITE FOR YOUR COPY OF THIS BIG BOOK. Note its advertising volume, the bigness and broad range of its editorial content. Then you'll know why one magazine—DIESEL PROGRESS—covers this extremely active market ... *Why Buy Two?*

22 Markets that Make a Billion Dollar Industry...

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| ● Naval Architects | ● Industrial Power Users | ● Air Conditioning Plants | ● Shipyards |
| ● Utility Companies | ● Contractors— | ● Engine Manufacturers | ● Dairies |
| ● Government Officials | Road and General | ● Truck Fleet Operators | ● Ice Plants |
| ● Bus Companies | ● Municipalities | ● Irrigation Projects | ● Tractor Users |
| ● Logging Companies | ● Ship Operators | ● Mines | |

DIESEL PROGRESS

2 West 45th Street, New York 19, N. Y.

Edited and Published by

REX W. WADMAN

Affiliated publications, under the management of Rex W. Wadman: Diesel Engine Catalog ★ World Petroleum ★ Petroleum World ★ Petroleo Del Mundo ★ El Mundo Azucarero ★ Sugar ★ Sugar Reference Book ★ El Catalogo Azucarero

TENTATIVE PROGRAM

19th NATIONAL OIL AND GAS POWER CONFERENCE

HOTEL STATLER — CLEVELAND, OHIO

MAY 21-24, 1947

Note: The conference proper opens with registration 9 A.M. Wednesday, May 21st. The program directly below for Tuesday, May 20th, is a special lecture course sponsored by the O. & G. P. Division but is not to be considered as part of the 19th National Conference.

Tuesday, May 20

Lecture Course—"Diesel Fuel Oils—Production, Characteristics and Combustion."

9:00 A.M.

Registration for Lecture Course

Pine Room, Hotel Statler

Fees—ASME members \$12

Non-members \$15

9:30 A.M.

Lecture I

Pine Room

"Production of Diesel Fuel Oils" by C. A. Rehbein, Head, New Process Design Section, Research & Development Department, Shell Oil Company, New York, N. Y.

12 Noon

Luncheon

Euclid Ballroom

2:00 P.M.

Lecture II

Pine Room

"Physical and Chemical Characteristics of Diesel Fuel Oils" by R. D. Pinkerton, Research Supervisor, Process Division, Research & Development Dept., Sinclair Refining Company, East Chicago, Indiana

8:00 P.M.

Lecture III

Pine Room

"Combustion of Diesel Fuel Oils" by Dr. M. A. Elliott, Asst. Chief, Synthetic & Liquid Fuels, Research & Development Division, U. S. Dept. of Interior, Bureau of Mines, Pittsburgh, Pennsylvania

Wednesday, May 21

9:00 A.M.

Registration

Mezzanine

Fees—ASME members \$2.00

Non-members \$3.00

Educators, students, authors, military personnel—no charge

9:00 A.M.

Exhibits

Grand Ballroom

12 Noon

Welcome Luncheon

Euclid Ballroom

2:00 P.M.

Ladies Program

To be announced

2:00 P.M.

Session I—Applications

Euclid Ballroom

"Suggestions on Use of Combustion Engines in Locomotives" by Prof. G. E. Unger, National School of Engineering, Lima, Peru

"Some Aspects of Fuel Injection for Aircraft Engines" by Prof. Israel Katz, Sibley School of Mechanical Engineering, Cornell University, Ithaca, New York

"Test Results of Internally Cooled Supercharging" by R. H. Miller, Chief Engineer Four Cycle Engine Division, Nordberg Manufacturing Co., Milwaukee, Wisconsin

6:30 P.M.

Stag Supper and Entertainment

Euclid Ballroom

8:00 P.M.

Ladies Program

To be announced

Thursday, May 22

9:00 A.M.

Registration

Mezzanine

9:00 A.M.

Session II—Fuels

Euclid Ballroom

"Diesel Fuel Oil Situation" by E. Miller, Asst. to Director, General Laboratory, Research Department, Socony-Vacuum Oil Co., New York, N. Y.

"A Comparison of Various Vegetable Oils as Fuels for Compression—Ignition Engines" by Prof. A. N. Baker and Prof. R. L. Sweigert, Director, General Engineering, Georgia School of Technology, Atlanta, Georgia

"Is Fuel a Major Factor in the Smokeless Operation of a Locomotive or Stationary Diesel" by R. J. Bender, Asst. to Chief Consulting Engineer, Sinclair Refining Co., New York, N. Y.

12:15 P.M.

Ladies Luncheon and Afternoon Program

1:30 P.M.

Inspection Trips

Trip 1—General Motors Corp., Cleveland Diesel Engine Division

Trip 2—National Advisory Comm. for Aeronautics Laboratory
(Visitors must be citizens)

5:30 P.M.

Exhibitors Social Hour
Pine Room

6:30 P.M.

Banquet
Euclid Ballroom
Speaker to be announced

Friday, May 23

9:00 A.M.

Registration
Mezzanine

9:30 A.M.

Session III—Bearings
Euclid Ballroom
"Sleeve Bearing Design Fundamentals for Diesel Applications"
by W. E. Thill, Design Engineer, Federal-Mogul Corp., Detroit, Michigan
"Large Bearing Design, Application and Operation" by E. Crankshaw, Asst. Chief Engineer, Bearing Design & Application Division, and G. W. LaPier, Supervisor of Metallurgical Control, Cleveland Graphite Bronze Co., Cleveland, Ohio

11:00 A.M.

Exhibits Inspection
Grand Ballroom

12:15 P.M.

Ladies Program

1:30 P.M.

Inspection Trips
Trip 1—Cleveland Graphite Bronze Co.
Trip 2—Alcoa Research & Development Laboratories, and Ohio Crankshaft, Inc.

8:30 P.M.

Baseball—Cleveland Indians vs. St. Louis Browns

Saturday, May 24

9:00 A.M.

Registration

9:30 A.M.

Session IV—Bearings
Euclid Ballroom
"Diesel Engine Bearings" by B. J. Esarey, District Engineer, National Bearing Division, American Brake Shoe Co., St. Louis, Missouri
"Behaviorism of Aluminum Alloy Bearings in Diesel Engines" by D. B. Wood, Development Engineer, Cleveland Division Aluminum Company of America, Cleveland, Ohio

Bowser Sells Portion of Business To Manzel

DISCONTINUANCE of the manufacture of its force feed lubricators and the sale of its repair parts business on both Bowser and Torrington models to Manzel Brothers Co. of Buffalo, N. Y., has been announced by Bowser, Inc. of Fort Wayne, Ind.

The Manzel firm, a subsidiary of Frontier Industries, Inc., whose plant is located at 309-319 Babcock Street, Buffalo 10, N. Y., has been manufacturing force feed lubricators exclusively for nearly 50 years. A new addition to the Manzel plant has doubled its floor space, giving

the company ample capacity to produce Bowser and Torrington lubricator parts for replacement purposes.

Nordberg Appoints Works Manager

ARTHUR G. HALL formerly with the Koppers Company has been appointed Works Manager of Nordberg Manufacturing Company. Following his graduation from the Massachusetts Institute of Technology in 1925 with a B. S. Degree in Mechanical Engineering, he joined the Bartlett Hayward Company and was engaged in various engineering capacities which led to the position of Works Manager of the

Western Gas Division of the Koppers Company at Fort Wayne. He later returned to the Bartlett Hayward Division of Koppers and during the war was in charge of their several plants in Baltimore. His previous experience in building a wide variety of machinery parallels the extensive line built by Nordberg.

SALES ENGINEER

Well established Midwest Diesel engine manufacturer requires services of experienced Diesel Sales Engineer, 35-45 years old, some traveling. Write fully as to experience, age, salary. Replies confidential. Address: Box 168, DIESEL PROGRESS, 2 W. 45th St., New York 19.



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GENUINE DIESEL PARTS

From Government Surplus

SPRAY TIP AND VALVE ASSEMBLY
Clean, fresh stock. All brand new.

Gm No.	Gm Name	List
5227323	VALVE & SEATS	\$3.25
5227318	VALVE STOPS	.40
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Diesel Takes Over 17 New York Central Trains

THE New York Central System announced recently that Diesel locomotives were replacing steam on 17 separate runs in a move to cut running times from 5 to 158 minutes on its scheduled service. The move to speed schedules was effective on April 27th with the beginning of Daylight Saving Time.

The Dieselized Twentieth Century Limited will cut its schedule by 30 minutes on the Chicago-New York run. Westbound time will be reduced considerably with the Knickerbocker cutting 15 minutes from its former time to St. Louis, and the Water Level and the Wolverine 35 and 30 minutes faster respectively to Chicago. The Lake Shore Limited will make the Chicago run 40 minutes under its previous times. Two Montreal trains, the Montreal Limited and the Mount Royal, will cut 10 minutes off former running times.

Diesels will take over on the through trains from St. Louis. For the Chicago-New York runs, Diesels will haul the Twentieth Century Limited, the eastbound Commodore Vanderbilt, the Wolverine, the Empire State Express, and the westbound Lake Shore Limited.

Cummins Resumes Publication

PICTURES and stories of nearly 100 varied installations of Cummins Diesel engines are included in the first post-war edition of "The Dependable Diesel," a magazine published by the Cummins Engine Company, Inc. The 36-page magazine tells of successful applications of the Cummins Diesel engine in the trucking, marine, logging, railroad, petroleum, construction, mining and railroad fields, along with a number of miscellaneous applications.

A complete account of the steps which the company took in testing its first successful high

speed Diesel engine is told in an article entitled "High Speed Diesel Pioneer," and the story of the Cummins Sales and Service network is told in another two-page article. Copies of the magazine may be obtained from any Cummins dealer or by writing to the Cummins Engine Company, Inc., Columbus, Ind.

Nordberg Names Mexico Representative

NORDBERG Mfg. Company of Milwaukee, Wisconsin has appointed D. M. Booth as Regional Manager, Export Division. A graduate

of the Universities of Alabama and Cornell, he has been Chief Engineer and Superintendent of Power in both Diesel and steam plants in United States and Mexico. During the war he was engaged as Mechanical Engineer in connection with the work of the United States Railway Mission in Mexico.

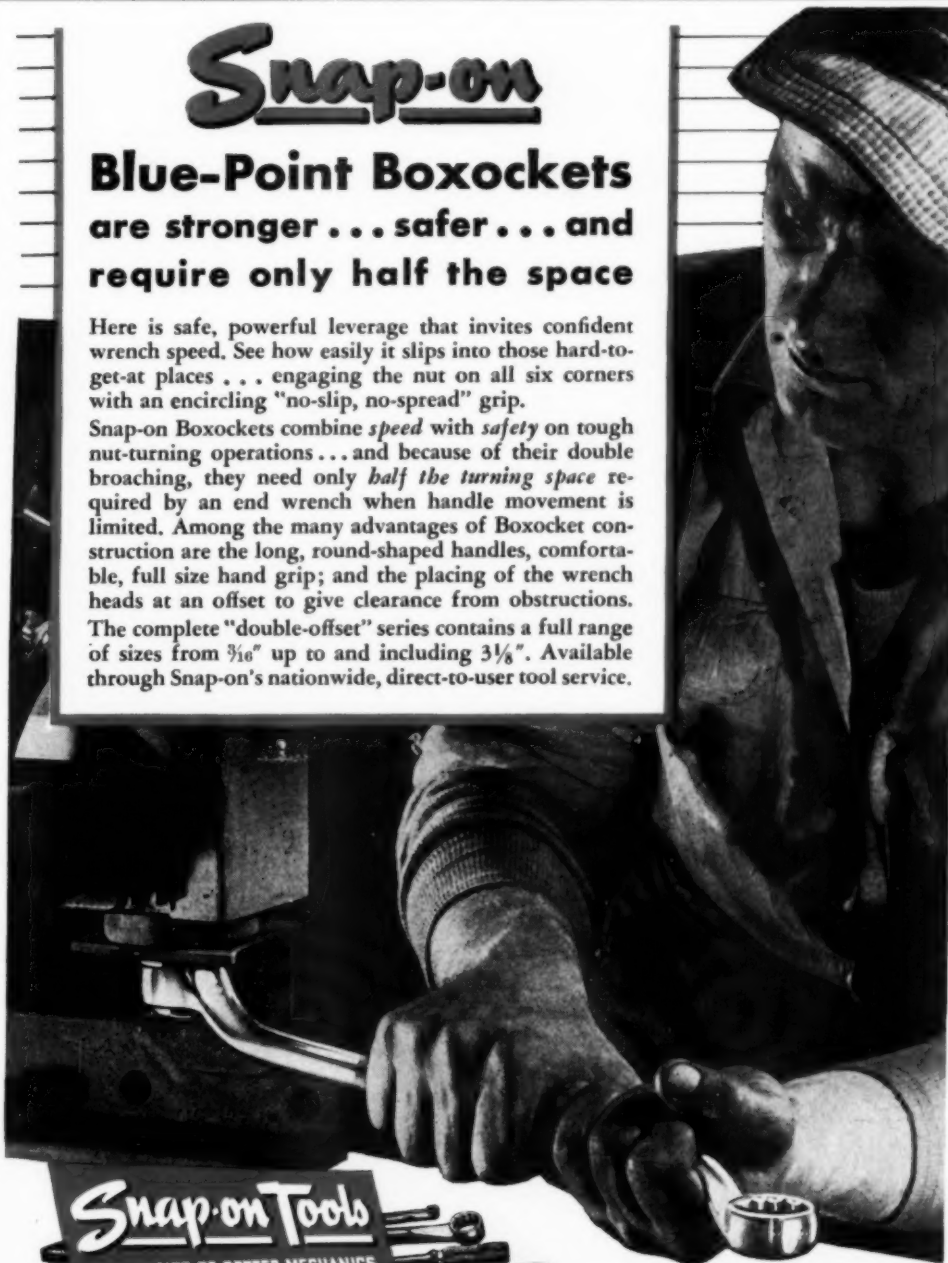
Mr. Booth was formerly in charge of Mexican operations for the Worthington Pump and Machinery Corporation in Mexico where he has lived for fifteen years. He will cover Mexico and Central America for Nordberg.

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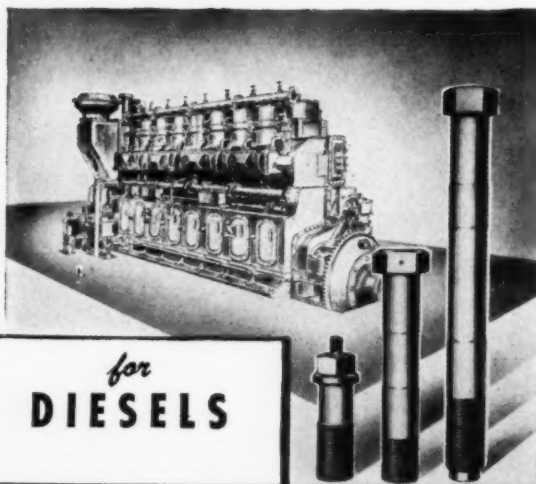
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WEST COAST DIESEL NEWS

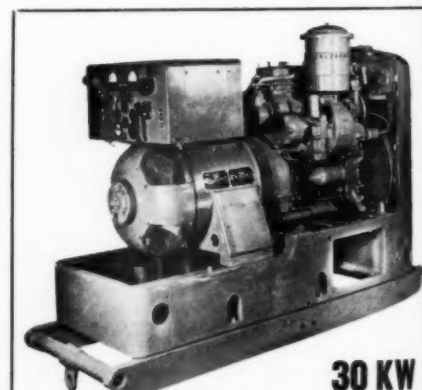
By FRED M. BURT

DIESEL truck owners and drivers are cooperating in the anti-smog fight in Los Angeles according to Harry E. Kunkel, Director of Air Pollution Control. In an eight hour survey by three inspectors, of 605 trucks observed, 530 were well within the strict city ordinance, 40 were a trifle over, and five emitting enough smoke to make prosecution likely.

THE Santa Fe Railway has now completely Dieselized all of its switch engines in Los Angeles, with 29 in use. The last four steam engines were removed the first of April.

A 65 ft. ferry with 32 ft. beam and powered with an 85 hp. Atlas Imperial Diesel, is being built for C. A. Lauritzen of Antioch at Colberg Boat Works, Stockton, Calif. The steel craft has a screw on each end and will operate between Jersey Island and the Webb Tract in the San Joaquin delta.

THE first postwar Coast-to-Coast yachting excursion, ultimately to reach New York and touching in Mexico, Central American ports



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PROGRESS MAY 1947

Panama, etc., is now under way. Capt. R. C. Wilson and Mrs. Wilson are on their 80 ft. x 15 ft. Diesel yacht *Dorsal*, powered with two 200 hp. General Motors Diesels. Its range 1061 miles, crew of four.

THE *White Star*, one of the largest all-steel tuna clippers afloat, built by the Guntert & Zimmerman Shipyard, Stockton, for Van Camp Sea Food Co. is powered by an Enterprise turning-charged Diesel, rated 1200 hp. at 300 rpm.

BUILT at the Astoria shipyards of Columbia River Packers Assn. for Capt. Ralph Horne, unique deep trawl and tuna fisher, with a 76 ft. x 22 ft. x 10 ft. wooden hull, the *Kiska* has a Fairbanks-Morse 6 cyl. Model 35 Diesel for propulsion, two Caterpillar Diesels connected to 25 kw. Fairbanks-Morse generators as auxiliaries.

ONE of the new cargo vessels ordered by Canadian National Steamships, is nearly completed at the yards of Burrard Shipbuilding Co., Vancouver, British Columbia; powered with a 6,000 hp. Vickers-built Diesel engine driving a single screw. Overall length 436 ft., 7,500 tons deadweight, 15 knots.

GRIDLEY Boat Works, Newport Beach, has about completed a 42 ft. combination boat for R. M. Conley, to be powered with a General Motors 225 hp. Diesel.

THE San Diego, Star & Crescent Co. tug *San Jacinto*, Capt. Johnson, is getting a new General Motors 165 hp. Diesel engine at San Diego Marine Construction Co.

THE new San Francisco Bay tug, P. G. & E. 12, recently launched at the Hunters Point yards of Anderson & Christofani, a 48 ft. wood-hulled boat, is powered with a Caterpillar marine Diesel.

THE *Morning Star* (R. S. Rheem, St. Francis Yacht Club, owner), is being remodeled at Alameda and re-powered with a Caterpillar marine Diesel, purchased from Thomas A. Short Co., San Francisco.

THE *Balestri Bros.*, a 40 ft. x 12½ ft. combination boat, is the 20th boat that Genoa Boat Works has built for Manuel Balestri since 1906, and is powered with a Lorimer Diesel, 4 cyl. 60 hp. at 600 rpm.

A ONE hundred four hp. Buda Diesel powers a new 45 ft. net boat *Nina Ann*, and was supplied by Drake & Bullen, distributors for

Buda in San Diego; owner Frank Navarro.

THE 123 ft. steel tuna clipper *Sunset*, designed by G. Bruce Newby, built in Long Beach for the Bregante family in San Diego, has an 850 hp. Atlas Imperial Diesel, turning up to 300 rpm., for propulsion power.

POWERED with an 800 hp. supercharged Enterprise Diesel is the new 124 ft. *Katie Lou*, flagship of a new tuna cannery at San Diego, People's Packing Corp. Owned and operated

by Louis Strada and associates. Auxiliaries are two 120 hp. Lorimer Diesels.

JUST completed at the Martinolich yards in San Francisco, is the 42 ft. *Chenamaba*, a fishing boat for Paul Gatto; powered with a 225 hp. General Motors marine Diesel.

A TUNA-SARDINE purse seiner nearly completed at the Peterson Boatbuilding Co., Tacoma, built for stock, is powered with an 8 cyl. Enterprise Diesel of 617 hp. at 450 rpm.

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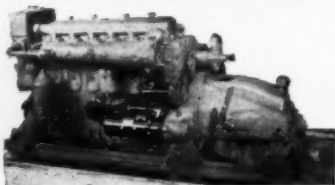
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